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Naval Reserve Medicine: recruitment difficulties in the Medical Corps

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MONTEREY, CALIFORNIA

THESIS

NAVAL RESERVE MEDICINE: RECRUITMENT DIFFICULTIES IN THE MEDICAL CORPS

by

Christopher Santos

March 2016

Thesis Advisor: Chad W. Seagren
Co-Advisor: William Hatch

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This thesis analyzes the effect of Naval Reserve Medicine (NRM) policies and procedures on the recruitment of civilian physicians as Direct Commissioned Officers (DCO) and their affiliation as Career Transitioning Officers (CTO) in the Reserve Component (RC) of the Medical Corps (MC). NRM has a difficult time filling and maintaining MC Officers in the RC and the factors that cause such difficulty have never been studied. Organizational policies and procedures are analyzed to pinpoint congruency of the organization's strategy in recruiting sufficient MC Officers in a constantly changing role and environment of the RC. A costs analysis is implemented to determine the role of pay and incentive in attracting physicians to sign up or affiliate in the reserves. It is also used to identify the competitiveness of military pay for physicians compared to the civilian counterpart. A DCO earns more by joining the military service compared to newly graduated physicians who elect to work in the civilian sector; therefore, the strategy should focus on recruiting DCOs. On the other hand, negative effects on the civilian and military pay gap are seen during the activation of MC Officers in the RC greater than a year for a total of three years and during deployment, which causes a negative appeal for civilian physicians to join the reserves. The outcome of the organizational model suggests that there is a need to re-align organizational strategy and culture to enhance recruitment success within all levels.

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**NAVAL RESERVE MEDICINE: RECRUITMENT DIFFICULTIES IN THE
MEDICAL CORPS**

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Lieutenant, United States Navy
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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
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LIST OF ACRONYMS AND ABBREVIATIONS

AC	Active Component
ADT	Active Duty Training
AIC	Akaike's Information Criterion
ASL	Active Status List
AT	Annual Training
ASP	Additional Special Pay
BA	Billet Authorized
BCP	Board Certified Pay
BSO	Budget Supporting Office
BUMED	Bureau of Medicine and Surgery
BUPERS	Bureau of Personnel
CNRF	Commander of Naval Reserve Forces
CONUS	Continental United States
CTO	Career Transition Officer
DA	Direct Accession
DCNO	Deputy Chief of Naval Operation
DCO	Direct Commission Officer
DFAS	Defense Finance and Accounting Service
DMDC	Defense Manpower Data Center
DOD	Department of Defense
DON	Department of the Navy
EMF	Expeditionary Medical Facility
FTS	Full Time Support
GME	Graduate Medical Education
HPSP	Health Professions Scholarship Program
IDT	Inactive Duty Training
INV	Inventory
IRR	Individual Ready Reserve
ISP	Incentive Special Pay
MD	Medical Doctor

MTF	Medical Treatment Facility
NMETC	Navy Manpower Education and Training Command
NPC	Navy Personnel Command
NPS	Naval Postgraduate School
NPV	Net Present Value
NRC	Navy Recruiting Command
NRM	Naval Reserve Medicine
OHSU	Operational Health Support Unit
OPNAVINST	Operational Navy Instruction
OSO	Operational Support Office
PRD	Periodic Rotation Date
RAO	Reserve Action Officer
RC	Reserve Component
SELRES	Selected Reserve
TA	Tuition Assistance
TMS	Training for Medical Specialty
UIC	Unit Identification Code
USC	United States Code
USDHSS	United States Department of Health and Human Services
USUHS	University of Health Science
VSP	Variable Special Pay

ACKNOWLEDGMENTS

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I.   INTRODUCTION

A.   BACKGROUND

The Department of the Navy (DON) provides operational support to the fleet by ensuring a sufficient number of medical professionals are always available in the Naval Reserve Medicine (NRM) community. NRM supports the fleet's mission and combatant commander's vision by having forces ready to respond during national crises. Furthermore the purpose of NRM is to provide a pool of trained and qualified medical professionals who can be mobilized anywhere in the world during contingency, humanitarian and disaster relief operations, and annual operational training evolutions critical to a warfighter's success in the theater of operation.[1] The traditional role of the mobilized Reserve Component (RC) occurs when an Active Component (AC) counterpart is deployed and the RC is required to replace the AC in their respective Medical Treatment Facility (MTF). But the changing role of the reserve is reflected on the occurrences of actual boots on ground deployments either at a fleet hospital with the Marines or onboard a hospital ship mission in a hazardous area.[1]

Accessing and retaining highly trained and qualified medical personnel is a difficult task during high tempo deployments. NRM has a difficult time filling and maintaining Medical Corps (MC) officers. An in-depth examination of the cause of this problem is never examined. The Bureau of Medicine and Surgery M1 (BUMED-M1) Total Force has a modeling tool for the AC which allows M1 to project their future manpower and personnel requirements. This tool enables them to establish the appropriate future mix of officers, recruiting requirements and personnel required for education and training pipelines to enable Navy Medicine to maintain specific requirements by growing and recruiting other professionals.[2] Overall this tool makes it much easier to predict AC Navy Medicine Manpower requirements. It is built taking into account many variables and parameters. Unfortunately, at the time this tool was

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[1] Herbert L. Zick. "Changing Roles and Missions of the Medical Branch of the Naval Reserve during the Period 1987–1995" (master's thesis, Naval Postgraduate School, 1996).

[2] James Clearwood, email discussion with the author, October 2015.

1

developed, NRM was not considered. As a result, much of the analytics that go into determining manpower and personnel requirements for NRM are very one dimensional (i.e., loss rates and percentage of billets filled) by officer corps and subspecialties, and may lack an appropriate association with RC requirements. The Naval Reserve Medicine aims to identify the causes of recruiting difficulties and understand how AC requirements and past mobilization requirements affect this problem. Table 1 shows that Navy Medicine has the lowest percentage of RC Manpower to Total Force mix of any of the three Services (year 2005 is an exception).

Table 1.   Department of Defense Medical Manpower Requirement

Year	2005	2006	2007	2008	2009	2010	2012	2013	2014 (Est)	2015 (Est)
Navy	675	562	5	510	554	726	690	683	674	672
Army	2273	2211	2012	1983	1862	1804	1914	1741	2366	2294
Air Force	627	1049	1037	978	893	1007	1351	1104	1162	1162
DOD	3575	3822	3550	3471	3309	3362	3955	3528	4202	4128

Adapted from Office of the Assistant Secretary of Defense for Readiness & Force Management, "Defense Manpower Requirements Report from FY05 to FY15," December 2015, http://prhome.defense.gov/Portals/52/Documents/RFM/TFPRQ/docs/F15%20DMRR.pdf.

It is difficult to determine if NRM has the appropriate RC requirements to meet their total force needs as shown in Figure 1.[3] A thorough study and understanding of the factors unknown to NRM may improve the accuracy of identifying future manpower requirements with a more systematic approach in order to predict actual manpower requirements.

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[3] Ibid.

Figure 1.   Medical Corps Officer Manpower Trend 2005–2015
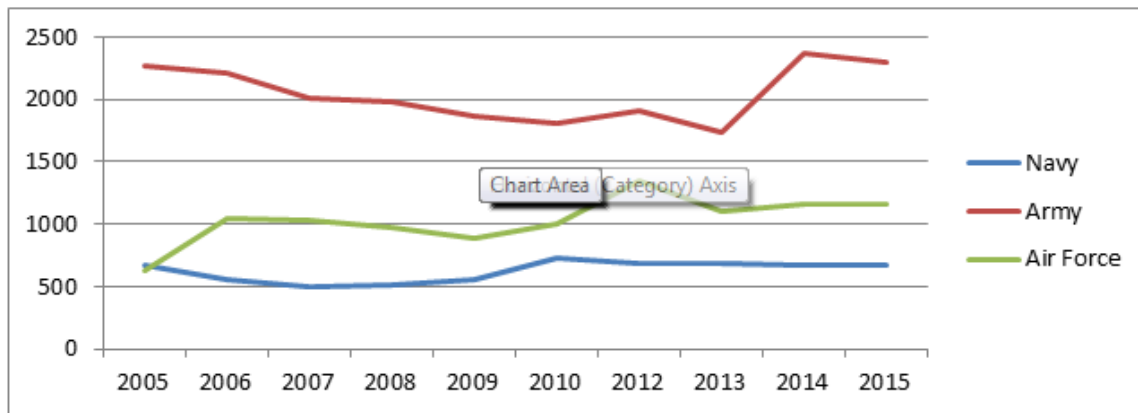
Adapted from Office of the Assistant Secretary of Defense for Readiness & Force Management, "Defense Manpower Requirements Report from FY05 to FY15," December 2015, http://prhome.defense.gov/Portals/52/Documents/RFM/TFPRQ/docs/F15%20DMRR.pdf.

This study examines the factors that affect the recruiting and affiliation difficulties at NRM. Various data is examined to identify those factors including a thorough study in the processes and policies that governs the RC, effects of the military and civilian pay gaps and organizational designs that may be identified to assist NRM in their day to day goals.

B.   OBJECTIVES

The primary purpose of this thesis is to identify and examine the factors affecting the difficulties in the recruitment and affiliation of Medical Corps Officers at NRM. This includes reviewing the civilian and military pay gap in the Medical Corps to identify the effects of the wage differential in the recruit decision to affiliate or join the military service. Organizational design of the NRM is analyzed in order to align the strategy required to increase and meet their goals. An organizational model is implemented to diagnose a need for transformational process to align organizational culture that aims to find the right person for the right job.

C.   RESEARCH QUESTIONS

This thesis attempts to answer the following primary questions:

- What are the underlying causes of recruiting difficulties in the Navy RC in the Medical Corps?

- How does the civilian and military pay gap affect recruitment and affiliation of MC in the NRM?

Secondary questions:

- What organizational theories and designs can realign NRM personnel to establish a culture that will aid in achieving their goals?

- How does adjusting Special Pay incentive affect affiliation?

An organizational model allows NRM to re-evaluate the need for organizational transformation that aligns its structure and culture to address the changes in the role of reserves in the MC. Recruitment difficulties facing NRM are rooted in the need for organizational re-alignment stemmed from the ever changing roles of the MC in the RC. A change in processes and consideration of factors such as the economy and politics must always be monitored to ensure that the organization leverages its strategy in a timely manner. Cost analysis comparing pay among civilian and military shows a gap across different specialties. Along with the scenario based cost comparison, this disparity in pay causes negative appeal among potential recruit to join the military service. DCO as a source of applicants must be prioritized in terms of budget program allotment since the result of the cost analysis shows competitive return on investment compared to those who are newly practicing physicians in the civilian sector. The policies that govern pay and incentives for MC in the RC are not competitive and greatly contribute to the difficulties in recruitment of MC in the RC.

D.   ORGANIZATION OF STUDY

Chapter II includes information regarding the organizational background and literature reviews of previous studies related to the difficulties and retention of Medical Corps officers in the reserves. Chapter III discusses the organizational model used for the transformation process of NRM. Chapter IV is an explanation of the data to be used in the analysis and provide facts and figures in order to explain the factors that affect recruitment in the NRM RC through cost analysis. Chapter V reviews the detail of the cost analysis and presents the outcome of the study. Chapter VI includes the summary of the results, conclusion and recommendation needed for further study.

II.   INSTITUTIONAL BACKGROUND AND LITERATURE REVIEW

A.   INTRODUCTION

The history of the Navy Reserve Component (RC) can be best described as rich and ever changing. During the Cold War era, the RC was utilized as a manpower pool that is rarely used in any capacity. After World War II through the late 1980s, they were activated merely one time in each decade by the federal government.[4] But afterwards, the RC's changing role in the strength of the nation's armed forces showed an increase in the tempo of deployments, and utilizations both in the traditional role and actual forward deployment in major conflicts.

Navy RC physicians are primarily made up of civilians who aim to establish a career. The normal activity that the RC engages in the military involves annual trainings (AT), drill with a frequency of one time per month, and actual utilization to replace active duty around the globe. All RC personnel are assigned to one of the three major categories in the Ready Reserve, Standby Reserve and Retired Reserve.[5]

1.   Ready Reserve

The Ready Reserve is the main source of manpower pool in the RC who is called to active duty before activating the Standby Reserve and the Retired Reserve for any major conflict around the globe when needed. There are other categories under the Ready Reserve such as the Selected Reserve (SELRES), Full Time Support (FTS), and the Individual Ready Reserve (IRR). SELRES are those units who are highly trained and prioritized to deploy in support of any mission compared to the other sub category as shown in Table 2. IRR on the other hand are those personnel who are already trained but

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[4] Herbert L. Zick. "Changing Roles and Missions of the Medical Branch of the Naval Reserve during the Period 1987–1995" (master's thesis, Naval Postgraduate School, 1996).

[5] Lawrence Kapp. *Reserve Component Personnel Issues: Questions and Answer* (CRS Report No. RL30802). Washington, DC: Congressional Research Service, 2012. https://www.fas.org/sgp/crs/natsec/RL30802.pdf.

may be required to undergo additional training when needed. Some other units that fall under the IRR include the Voluntary Training Unit and the Active Status Pool.

Table 2.   Medical Corps Officer and SELRES Inventory FY 2005–2012

CORPS	FY05 BA	FY05 INV	FY06 BA	FY06 INV	FY07[1] BA	FY07[1] INV	FY08 BA	FY08 INV	FY09 BA	FY09 INV	FY10 BA	FY10 INV	FY11 BA	FY11 INV	FY12 BA	FY12 INV
MC	738	689	716	619	716	514	718	521	709	560	730	557	689	571	693	556
DC	272	259	266	250	254	222	252	229	249	255	250	261	247	275	251	287
NC	1,359	1,608	1,335	1,464	1,336	1,283	1,336	1,231	1,328	1,112	1,342	1,128	1,330	1,233	1,300	1,228
MSC	368	485	339	429	341	428	347	410	341	319	359	379	344	401	360	393
HM	5,161	4,467	4,813	4,051	4,722	4,624	4,612	4,591	4,492	4,592	4,635	4,787	4,134	4,747	4,524	4,421

Adapted from Bureau of Medicine and Surgery, "Navy Medicine Strategic Plan FY-15," March 2014. http://www.med.navy.mil/sites/nmpdc/courses/Documents/Forms/ AllItems.aspx.

2.   Standby Reserve

RC individuals in this category are commonly referred to as members who are in the Active Status List (ASL); personnel who established hardship, who incurred temporary disability and who possess key defense related positions in their civilian work. During full mobilization in support of major conflicts, RC personnel in this category can be involuntarily activated. There are also other category under the Standby Reserve including those who are in the inactive status list not be training for points and pay, and who are not eligible for promotion.[6]

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[6] Ibid., 3–4

3.   Retired Reserve

Retired officers and enlisted personnel who served in the military as Active Component (AC) comprise majority of the Retired Reserve. Other personnel who are eligible in this category are those who transferred in to the Retired Reserve after qualifying for retirement, but before becoming eligible to receive retirement pay. RC personnel in this category can only be activated to mobilize when there is a recall for retirees.[7]

B.   INSTITUTIONAL BACKGROUND

1.   Purpose of Reserve Component

The significant role of Naval Reserve Medicine (NRM) in the military includes providing support to the mission and vision of Naval Medicine through integration, augmentation, sustainment, and medical readiness. In order to accomplish this, NRM must be able to effectively utilize their medical assets to assist the increase in tempo of medical deployments for various missions around the world. Therefore, some of the main missions of NRM are to ensure that recruitment goals are sustained depending on the trend of utilization of reserves. Retention of highly qualified medical professionals is continuously monitored in order to ensure the availability of qualified medical assets to support requirements in the military.

2.   Naval Reserve Medicine

RC commands under the Budget Supporting Office 18 (BSO) includes seven Operational Health Support Units (OHSU) located at Bremerton, Jacksonville, Camp Lejeune, Camp Pendleton, Pensacola, Portsmouth, and San Diego (see Figure 2).

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[7] Ibid., 4

Figure 2.   Naval Medical Reserve Organization
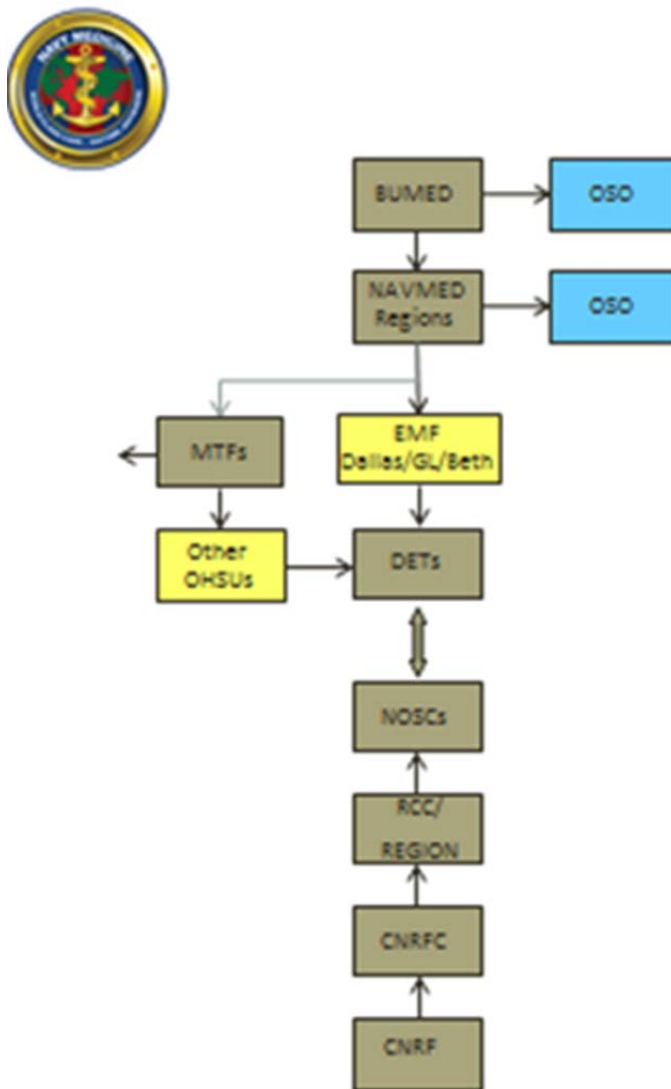
Other commands that are activated during major conflict in different areas of the world include three Expeditionary Medical Facilities (EMF's) located in Dallas, Greatlakes, and Bethesda. The RC also has a command dedicated to training and education under the RC Naval Medical Education and Training Command (NMETC). Figure 3 shows the different NRM organizational region and work flow relationship between units.

Figure 3.   Naval Reserve Region

Adapted from Bureau of Medicine and Surgery, "Navy Medicine Strategic Plan FY-15,"
March 2014. http://www.med.navy.mil/sites/nmpdc/courses/Documents/Forms/
AllItems.aspx.

3.   Types of Naval Reserve Medicine Orders

There are three types of RC orders that reservists may receive during their
military careers categorized as training orders, extended active duty orders, and
mobilization orders.

a.   Active Duty for Training

The duration of such training is often flexible based on the type of mission
support required for the evolution. Normal salary pay, per diem and travel pay are

authorized only if the Commander of the Naval Reserve Forces (CNRF) allocated specific budget for such a specialty.[8]

b. *Active Duty for Special Work*

This type of order is initiated through the request of an MTF, Regional Operational Support Office (OSO), BUMED and Bureau of Personnel (BUPERS) with a maximum of three years activation. Availability of such support is based on allocated budget from the CNRF.[9]

c. *"265" Recall (U.S.C. Title 10, sec 12301(D))*

This type of recall normally lasts two to three years in duration and is limited to the medical community billet for officers. Recalled personnel are for positions held at the staff headquarters and OSO.[10]

d. *Full Time Support Staff*

Full Time Support (FTS) staffs specifically for Navy Hospital Corpsman billets are detailed to a duty station with similar pay and benefits as their AC counterparts. Medical Officers in the RC community are not authorized for such a recall.[11]

e. *Inactive Duty Training*

Normal training composed of 48 paid drills per year, two day drills every month based on budget availability and per diem for travel may also be authorized. According to BUMED, "A compensation at the rate of one-thirtieth of the basic pay prescribed for grade and years of service for the performance of each authorized period."[12]

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[8] Bureau of Medicine and Surgery, "Navy Medicine Strategic Plan FY-15," March 2014. http://www.med.navy.mil/sites/nmpdc/courses/Documents/Forms/AllItems.aspx.

[9] Ibid., 13

[10] Ibid.

[11] Ibid.

[12] Ibid.

f. Annual Training

BUMED validates the requirement for annual training before a member is identified; Figure 4 shows the flowchart for reserve AT. Typically 12 to 17 days of service specific training per year (up to 29 days, when funding is available) is required for MTF command support, on the job training (OJT), coursework, and other military exercise/mission support.[13]

Figure 4.   Reserve Annual Training Sample Flowchart
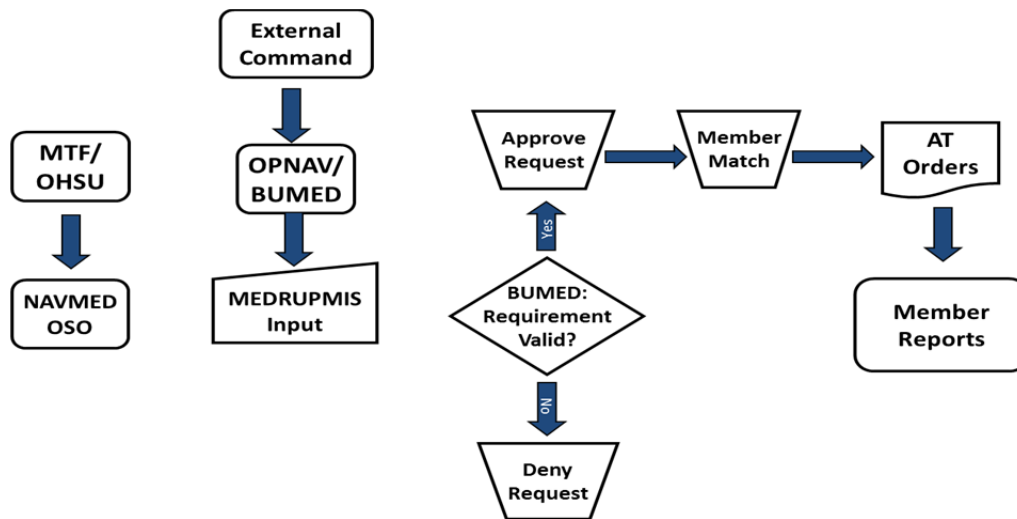
Adapted from Bureau of Medicine and Surgery, "Navy Medicine Strategic Plan FY-15," March 2014. http://www.med.navy.mil/sites/nmpdc/courses/Documents/Forms/ AllItems.aspx.

g. Additional Training Periods and Reserve Management Periods

This category of reservists is supplemental to an IDT drill as needed but is highly dependent on budget availability from the CNRF.[14]

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[13] Ibid.,12

[14] Ibid.

h. Full Mobilization

Activation of reservists in this category is reserved for major armed conflict or national emergency that may last greater than 6 months. There is no limit to the number of personnel activated and may include the Retired Reserve.[15]

i. Partial Mobilization

This type of mobilization involves involuntary activation of as many as one million Ready Reserve personnel for a period of 24 months. An example of such a call for activation was during the 1991 Persian Gulf conflict in the Middle East.[16]

j. Presidential Reserve Call-up

This type of mobilization of the RC personnel is normally initiated by the President who then notifies Congress within 24 hours of such determination. The number of involuntary activated reserves in this category may range to up to 200,000 Ready Reserves and may be activated for a period of 365 days or one year.[17]

4. Special Pay for Reserve, Recalled or Retained Medical Corps Officer

The entitlement for qualified Reserve Component Medical Corps officers is consistent with provisions contained in Title 37, United States Code (USC). They are eligible for Special Pay which includes Additional Special Pay (ASP), Incentive Special Pay (ISP), Board Certified Pay (BCP) and Variable Special Pay (VSP), on a pro-rata basis, based on the Fiscal Year Special Pay Plan in accordance with the Navy's OPNAVINST 7220.17, when one of the following apply:

- An RC Medical Corps officer is called to active duty, not for training includes those on initial active duty for training (IADT), annual training (AT), or additional duty training (ADT)), for a period of more than 30 days, but less than 1 year.

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[15] Lawrence Kapp. Reserve *Component Personnel Issues: Questions and Answer* (CRS Report No. RL30802), 16. Washington, DC: Congressional Research Service, 2012. https://www.fas.org/sgp/crs/natsec/RL30802.pdf.

[16] Ibid.

[17] Ibid.

- An RC Medical Corps officer who is involuntarily retained or recalled to active duty for a period of more than 30 days.

- An officer who voluntarily agrees to remain on active duty for a period of not less than 1 year at a time provided that officers are involuntarily retained on active duty and ASD determines that special circumstances justify the payment of special pay.[18]

A Medical Corps officer of the RC who is eligible for special pay must meet the same eligibility requirements as the Active Duty component. According to instructions, "The call or order and execution of a written agreement to remain on active duty must be for a period of not less than one year."[19] The method of payment differs subtly with the AC component. It also implies that all recalled reservists activated for at least one year are paid a lump sum for ASP and ISP and are paid monthly for VSP and BCP.[20] ADSW reservists are paid monthly on a prorated amount for all special pays to include ASP, ISP, VSP, and BCP. The instruction also states, "For activation to active duty not equal to 30 days a daily prorated amount is given."[21]

5. Accession Planning

The Deputy Chief of Naval Operations (DCNO) for Manpower, Personnel, Training and Education establishes an annual accession plan for the Navy RC in the Medical Corps which details factors including retention incentives and attainment of authorized strength in the specialty. BUMED states, "There must be sufficient accessions to support annual 5-year promotion plans for the inactive duty RC to ensure that the promotion opportunity and flow points that are necessary to meet authorized strength requirements are maintained."[22] The MC of the RC accession plan from FY11 to FY16 is shown in Table 3.

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[18] Deputy Chief of Naval Operations. 2005. Special Pay for Medical Corps, Dental Corps, Medical Service Corps, and Nurse Corps Officers. OPNAVINST 7220.17. Washington, DC, December 2015 http://www.med.navy.mil/bumed/Special_Pay/Documents/HomeLinks/References/ OPNAVINST%207220.17.pdf.

[19] Ibid., 65

[20] Ibid., 67

[21] Ibid.

[22] James Clearwood, email discussion with author. December 2015.

Table 3. Selective Reserve Medical Officer Accession Plan FY-2011-16

SELRES Medical Corps		FY-11		FY-12		FY-13		FY-14		FY-15		FY-16	
SSP	Specialty Name	Goal	Max	Goal	Max	Goal	Max	Goal	Max	Goal	Max	Goal	Max
15AO	Aviation Medicine	3	6	3	5	7	14	12	28	12	23	12	12
15A1	Aerospace Medicine	1	1	0	1	0	0	0	0	0	0	0	0
15B0	Anesthesia	21	43	25	38	20	30	25	33	25	30	20	30
15C0	General Surgery	26	58	30	50	25	40	39	49	39	42	34	35
15C1/ 6CD	Thoracic /CV Surgery	0	0	0	0	0	0	3	5	2	3	2	3
15C1/ 6CE	Colon Rectal Surgery	0	0	0	0	0	0	3	6	2	5	2	3
15C1/ 6CJ	Plastic Surgery	0	0	0	0	0	0	1	2	1	2	1	1
15D	Neuro Surgery	1	2	1	2	0	0	4	6	1	3	1	3
15E	OBGYN, General	2	2	1	2	0	0	0	1	0	1	0	1
15F	General Medicine	23	45	19	25	27	46	24	30	0	7	5	10
15G	Ophthalmology	0	0	1	2	2	3	0	0	0	1	0	3
15HO	Orthopedic Surgeon	16	26	20	38	22	35	28	28	27	32	24	25
15I	Otolaryngology	0	0	0	0	0	2	1	1	1	3	1	3
15J	Urology	0	0	0	0	0	0	1	1	1	2	1	2
15KO	Preventive Medicine	2	5	0	0	1	2	2	2	1	3	1	2
16N	Dermatology	0	0	1	1	1	1	0	0	0	1	0	0
16P	Emergency Medicine	14	20	9	15	7	9	7	7	8	22	2	3
16Q	Family Medicine	9	12	12	15	8	14	4	4	8	21	8	11
16R1	Internal Medicine	12	0	12	15	14	18	6	6	4	14	0	3
16R1/ 62C	Critical Care	0	0	0	0	0	0	0	0	1	7	1	3
16R1/ 6RG	Cardiology	0	0	0	0	0	0	0	0	1	6	1	4
16R1/ 6RP	Infectious Disease	0	0	0	0	0	0	0	0	1	3	1	3
16R1/ 6RR	Pulmonology	0	0	0	0	0	0	0	0	4	5	4	10
16T	Neurology	0	0	0	0	0	0	0	1	0	1	0	2
16U	Undersea Medicine	0	0	0	0	1	1	0	2	0	2	0	0
16V	Pediatrics	0	0	0	0	0	0	0	1	0	1	0	1
16X	Psychiatry	8	12	7	10	5	8	2	5	1	2	1	2
16Y	Diagnostic Radiologist	2	4	1	1	0	2	0	3	0	1	0	2
	TOTAL	140	160	142	220	140	225	165	288	140	243	125	188

Adapted from James Clearwood, email discussion with author. December 2015.

The determination of accession programs used to attain and maintain specialty authorizations is based on the current and projected supply and demand of officers in the MC.[23] The use of the most effective program is often maximized. NRM argues, "The relative cost, time and continuation rate to reach the desired number of RC Medical Corps officers are compared and used as the factors in determining which program to use."[24] Also, in order to adjust to the changes in the civilian market and in the MC requirements, flexible plans are often developed as a back-up. Similar to the AC, a reasonable career progression opportunity for the authorized strength of entry-level applicants are to be maintained.

The Office of the Medical Corps Chief makes an annual recommendation in terms of accession planning. The Reserve Affairs Officer (RAO) for the MC Chief reviews current policy and program authorization summaries addressing corps specific requirements. NRM suggests,

> Major factors, such as fiscal year RC Wartime Health Care Specialties with Critical Shortages, as identified by the Assistant Secretary of Defense, are a priority in the determination of accession planning. Other accession training programs such as Training for Medical Specialties (TMS) Flexible Reserve Drill Option with Navy Personnel Command (NPC) Medical Accessions Programs (N-314) are also considered as a basis in determining which accession programs are to be used.[25]

According to NRM, the RAO also reviews proposed specialty pay, bonus guidance, and promotion planning with the Medical Officer Community Manager (BUPERS-318M) for the upcoming year. Navy Recruiting Command (NRC) uses a three and five year history for projected gain and loss rates and recruiting goal performance to set new accession goals for evolving community demands. Gain and loss history is also reviewed with BUMED M-10. Once data reviews are complete, recommendations are forwarded to the RC Medical Corps Chief for review and approval. Final recommendations are reviewed by the respective Deputy Corps Chief and then forwarded

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[23] Ibid.

[24] Ibid.

[25] Ibid.

to the Medical Officer Community Manager (OCM) at PERS 318M.[26] Figure 5 shows the accession planning flowchart utilized at NRM.

Figure 5.   Flowchart Accession Planning
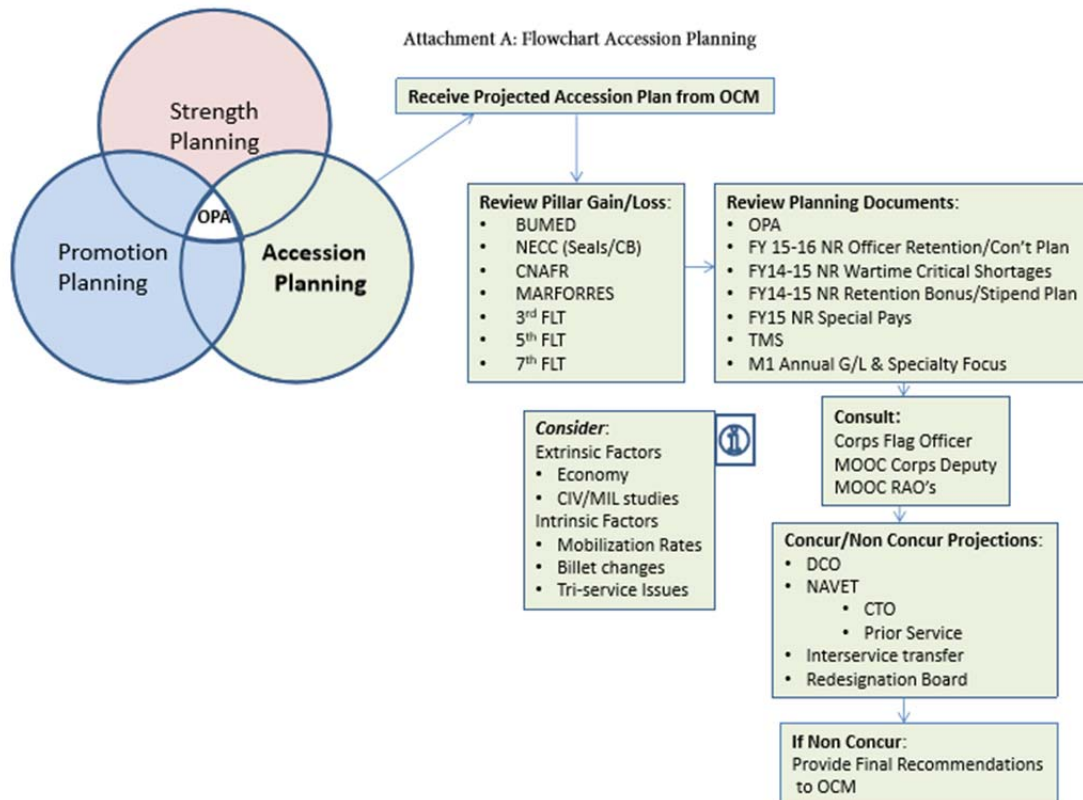
Adapted from James Clearwood, email discussion with author, December 2015.

C.   CIVILIAN PHYSICIAN SUPPLY AND DEMAND

In order to fully understand the difficulties faced by NRM in the recruiting of physicians for the RC Medical Corps, a comprehensive understanding of the supply and demand of civilian physician must be studied. According to projections from the Department of Health and Human Services, the rapid increase in demand for physicians and healthcare workers that began in 2012 will continue as baby boomers approach age

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[26] Ibid.

65 (see Figure 6). The same study projects a severe gap between supply and demand as the aging population grows from 10% in 2010 to almost 50% in 2020.[27]

Figure 6.   Population Growth 2000 to 2020
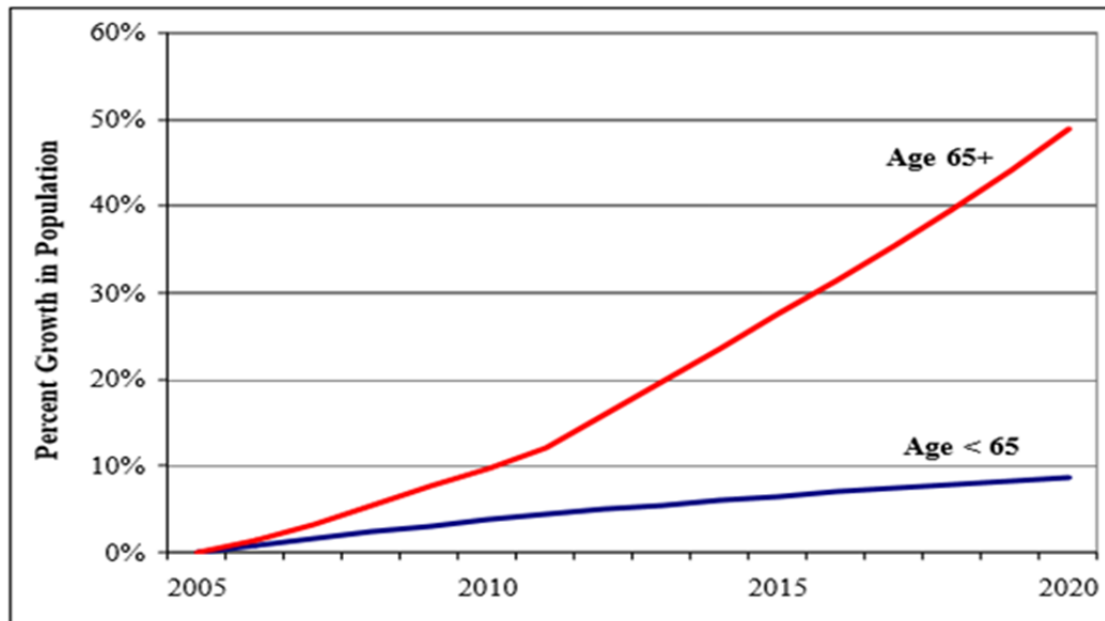
Adapted from the United States Department of Health and Human Services. "Physician Supply and Demand: Projections to 2020." February 1, 2016, http://bhpr.hrsa.gov/ healthworkforce/supplydemand/medicine/physician2020projections.pdf.

1.   Factors Affecting Physician Supply

The physician supply model estimates the number of medical providers in various specialties by considering the number of physicians that are currently active, new ones from medical schools and attrition due to retirement, death and disability. Department of Health and Human Services states, "Physician workforce that is currently available is estimated by size and characteristics. Physician demographics such as age and gender play a major role in determining the supply trends by calculating their retirement thus

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[27] United States Department of Health and Human Services. "Physician Supply and Demand: Projections to 2020."Accessed February 1, 2016, http://bhpr.hrsa.gov/healthworkforce/supplydemand/ medicine/physician2020projections.pdf.

shifting the distribution."[28] Therefore, the factors affecting physician supply can be divided into three main categories: demographics, new entrants and economic growth.

a.   *Demographics*

The age and gender distribution of the physician workforce is affected by a trend of phenomenal changes as we enter the 21st century. Males dominated the medical industry early in the century, which caused the number of physicians approaching retirement age to be of that gender. Almost 7 out of 8 physicians over the age of 55 are male. Female dominance occurred approximately 3 decades ago due to the increase of female graduates from 10 to 50%.[29] According to Department of Health and Human Services, "Because work and retirement patterns differ systematically for male and female physicians, the increasing proportion of physicians who are female has profound implications for the overall supply of physician services."[30] The age distribution of physicians under the age of 75 is illustrated in Figure 7.

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[28] Ibid., 4–5

[29] Ibid.

[30] Ibid., 5

Figure 7.   Percent of Physician Active in the Workforce
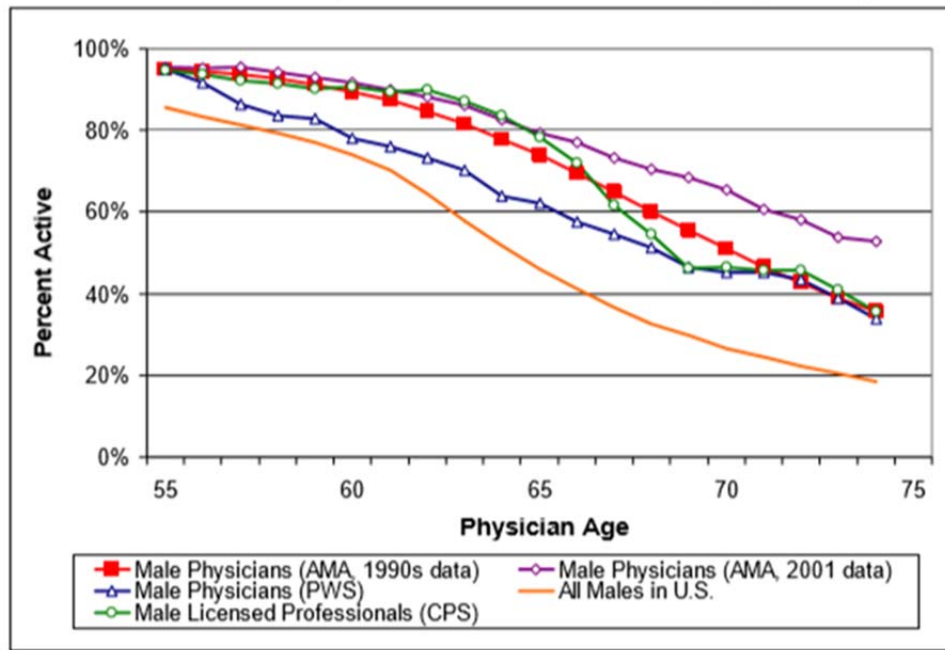
Adapted from the United States Department of Health and Human Services. "Physician Supply and Demand: Projections to 2020." February 1, 2016, http://bhpr.hrsa.gov/ healthworkforce/supplydemand/medicine/physician2020projections.pdf.

b.   New Entrants

The availability of physicians to sustain the demands of the future is highly dependent on the number of new entrants. Figure 8 depicts the constant increase in the output of medical schools in the country for the past 15 years. According to USDHSS,

> Almost 24,000 physicians complete their training through programs of graduate medical education (GME) each year. Before completing residencies and fellowships, new physicians must earn a four-year college degree and complete four years of medical education. Four out of five physicians completing GME are graduates of United States medical schools. Most are graduates of schools of allopathic medicine, which annually graduate approximately 15,000 to 16,000 MDs. This number has been relatively stable since 1980, and the baseline projections assume that the U.S. will continue to graduate approximately 16,000 MDs per year through 2020. Schools of osteopathic medicine graduate approximately 3,000 DOs per year, and the baseline supply projections assume that this number will steadily increase to approximately 4,000 per year over the next decade.[31]

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[31] Ibid., 6

Figure 8.   Increased Output from U.S. Medical Schools
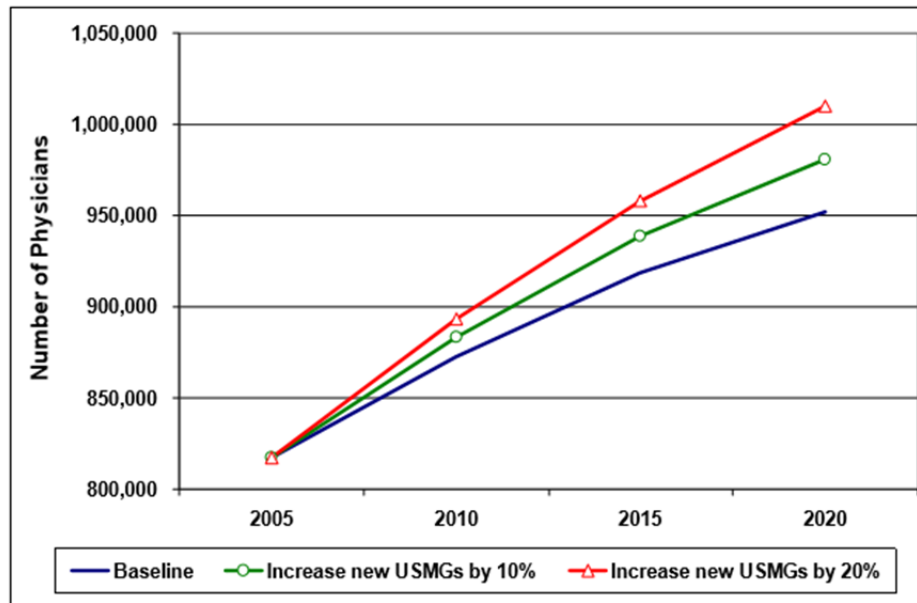
Adapted from the United States Department of Health and Human Services. "Physician Supply and Demand: Projections to 2020." February 1, 2016, http://bhpr.hrsa.gov/ healthworkforce/supplydemand/medicine/physician2020projections.pdf.

c.   *Economic Growth*

One of the major determinants of the adequacy of physician supply is based on economic growth. The theory suggests that as the economy grows the demand for physician services increases therefore physician salaries increases.[32] Healthcare as a normal good is consumed by individuals at a higher rate as their income rises, therefore, as economic growth tends to improve people's income, then we would expect demand for medical services to increase. This is also true when the ability to pay deductibles and copays becomes affordable then an expected higher consumption of such good is the result.[33]

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[32] James Avantes, "Demand for Family Physician Fuels Salary, Compensation Increases, Study Finds," July 9, 2013, http://www.aafp.org/news/practice-professional-issues/ 20130709mgmacompensation.html.

[33] Richard Cooper, Thomas Getzen, Heather Mckee, and Prakash Laud. "Economic and Demographic Trends Signal an Impending Physician Shortage," *Health Affairs* (2002). Doi:10.1377/hlthaff.21.1.140.

2. Physician Supply and Demand Projections

Although the strategy to improve policies, programs and government funding to support medical schools in the late 1950s and 1960s aimed to alleviate the potential shortage in the medical field.[34] The study conducted by the Department of Health and Human Services suggests that there is still a need to increase the capacity of the medical schools in order to support the aging populations need for medical care. The surge in the demand requires a modest increase in the supply through the next two decades. Although, based on their calculation future needs have sufficient supply in terms of physician but the analysis of Uwe Reinhardt suggests

> [It is a] daunting enterprise . . . to estimate the physician surplus or shortage one or two decades into the future. Any of the variables in the equation can change over time, sometimes in unforeseen ways.[35]

D. LITERATURE REVIEW

This chapter reviews prior research to examine recruiting and retention factors in the Medical Corps, Chaplain Corps, and Nurse Corps. Since there is no research conducted specifically to the Medical Corps RC in terms of those issues, the findings on the prior research for AC is used as a guide and basis in determining the difficulties in recruiting and retention for the RC in the NRM specifically in the Medical Corps.

1. Retention Elasticity and Projection Model for U.S. Navy Medical Corps Officers

The 2013 Naval Postgraduate School (NPS) thesis written by Alshehri and Brossard is a thorough study of the factors that affects U.S. Navy Medical Corps retention in service. The thesis analyzes the effects of civilian and military pay gap, lifestyle, military benefits and deployment to predict retention in the 19 specialties between the years of FY2002 and FY2011. Military retention is defined as the likelihood of the personnel to stay in the military after the initial obligation.

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[34] Department of Health and Human Services. *Summary Report of the Graduate Medical Education National Advisory Committee*. (HRA-81-651). Washington, DC: United States Government Printing Office, 1980.

[35] Reinhardt, Uwe.E. (2002). Analyzing cause and effect in the United States physician workforce. Health Affairs, pg 165. https://council.brandeis.edu/pdfs/2007/Reinhardt1-AnalyzingCause.pdf.

The sources of data for this study are BUMED, Defense Financial and Accounting System (DFAS) and Medical Group Management Association (MGMA). The final sample for cohorts FY2002 through FY2011 consisted of 4,960 observations of non-stayers and 3,326 of stayers in the military as shown in Table 4.

Table 4.   Number of Unobligated Providers at a Decision Point

	Fiscal Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
N=	634	642	726	633	534	475	377	331	324	284	4960
Stayers=	453	484	563	449	329	303	207	200	174	164	3326

Adapted from Abdullah Alsheri and Hyrum Brossard. "Retention Elasticity and Projection Model for U.S. Navy Medical Corps Officers" (master's thesis, Naval Postgraduate School, 2013).

The thesis also incorporates other variables in the probit regression model to analyze the trend and study the retention issues. Some of the variables that are used include gender, race, rank, accession sources, age and years of service. The finding of the study shows the effect of the civilian and military pay gap which negatively impacts the retention of Medical Corps in the U.S. Navy. As the gap of the physician's income widens, the ability to retain specialized doctors becomes very difficult especially if the skill is in demand in the civilian sector. The underlying figure in the pay gap of $98,787 is a major factor in retaining only 67% of Medical Corps officers. Also, based on the analysis, accession through USUHS tends to have a higher probability of staying in service compared to other accession sources. In terms of deployment in support of the Global War on Terrorism (GWOT) effects on retention, the study also finds that the probability of staying in the military decreased by 14.1 percentage points because of this factor.

The approach of the study that is conducted on active duty Medical Corps officers is timely as the war on terrorism escalated in the early and mid-2000 which perfectly shows the retention effects of the protracted war on retention. This is also a great time to

analyze the impact of the 2008 economic difficulties which seemed to have not affected the retention in the military for the specialty used for the thesis. Overall, the research found statistical evidence that the civilian and military pay gap and deployment has a negative impact on the retention of Navy doctors. Alshehri and Brossard recommended that

> As the civilian pay gap increases, it becomes more difficult to retain doctors in the Navy when their skills are easily transferrable in to the civilian sector. As a result, the Navy will potentially always have issues retaining its medical providers.[36]

2. U.S. Navy Chaplain Corps Recruiting: Ideas to Boost Deficiencies with Recruiting and Accessing of Chaplains

McGuffin's 2008 study of Chaplains in the U.S. Navy analyzes the need for incentives reform to boost recruitment in their field. He uses survey data to study the behavior and pattern instrumental in determining the efficiency of current programs. The incentive discussed in the study for the U.S. Navy includes only a single bonus incentive for those AC to transfer to RC. Other incentives which are similar to those for AC include guaranteed assignment, tuition assistance (TA), matching TA, loan repayment, scholarships and accession bonus.

The data collected from the survey indicated a need to boost incentives as recruitment lags behind the yearly goals. In order to expand the market of candidates, recruiting bonuses must be increased to enable recruiters to possess a tool to attract candidates. The loan repayment program which is already in place has a low impact on recruitment since only 61.5% of new Chaplains had educational loans when they were recruited and the remaining 33% of recruits does not have loans. Additional low cost incentive such as the guaranteed first assignment has substantial effect on recruitment but is not available for the Chaplain Corps. The data show that such an incentive may prove to have a large scale effect since 89% of seminarians suggested that availability of such an incentive has a greater value. Other incentive that yields a high outcome includes buddy assignments, hometown recruiting incentive, Chaplain recruiter incentive and

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[36] Abdullah Alsheri and Hyrum Brossard. "Retention Elasticity and Projection Model for U.S. Navy Medical Corps Officers" (master's thesis, Naval Postgraduate School, 2013).

restructuring of accession plan. Overall the importance of determining what factors entice recruits to join becomes very valuable. In order to obtain such information a thorough understanding of the markets preferences must be collected, as McGuffin argued

> The three surveys conducted by the researcher provided insight into the thinking of the seminarians, junior Chaplains and senior chaplains. These insights suggests where the Chaplain Corps presently finds itself and a few possible direction it may go to improve recruiting.[37]

3. Analysis of the Retention and Affiliation Factors Affecting the Active and Reserve Naval Nurse Corps

Pizanti analyzes the factors affecting the retention of Naval Nurse Corps (NNC) officer in the active and Reserve Component of the Navy. The study focuses on understanding the organizational factors and demographic effects on retention as well as the changes needed to be made to organizational design to ease the issue of manning shortages. It also looked at the affiliation of NNC in the reserves, how demographic and organizational factors affect the decision of nurses in the military to continue their service in the reserves.

The factors for the Active duty military include demographic characteristics of the NNC such as gender, race, family background and age. Other factor in the category includes deployment tempo and accession sources. On the other hand, the factors affecting reserve affiliation is compose of comparing enlisted and officer affiliation, characteristics of reserve job both in the military and civilian setting, family support and mobilization. Pizanti's analysis examines the factors affecting retention using logit regressions for both the active and reserve military.

The result of the study for the Active Component shows that males, having children regardless of marital status, prior enlisted, older age, black, minorities and postgraduate degree holders are more likely to stay in the service. Accession through the Medical Enlisted Commissioning program (MECP) yields a positive significant result in predicting retention possibilities which is higher than the other sources. The reserve

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[37] Frederick McGuffin. "U.S. Navy Chaplain Corps Recruiting: Ideas to Boost Deficiencies with Recruiting and Assessing of Chaplains" (master's thesis, Naval Postgraduate School, 2008).

affiliation model yields a totally different result in terms of demographics and other variables. Gender, race, schooling and training in large hospitals is not significant, therefore there is no difference in the behavior or decision of affiliation with these factors. The factors that are a positive indicator for affiliation to the reserves for the NNC includes commissioning age, accession source and prior enlistment, which concludes that personnel who tends to value retirement due to being older and prior enlisted with a commissioning source from other gain categories tend to affiliate at a higher rate. The finding from the thesis is able to support studies conducted in the past. The factors that positively affect retention and affiliation for both the active and reserve component is able to provide an insight on how goals and numbers must be concentrated on specific significant factors. This may lead to the determination of accession sources that may yield greater retention rates. Bonuses and recruiting efforts may be aligned on specific factors that may help manpower analysts formulate a more reliable forecast on how many personnel can be targeted at a higher possibility of recruiting success.

4.   Evaluating the Effectiveness of Navy Medical Corps Accession Programs

Schmidt and Colvin's 2012 thesis evaluates the effectiveness of Navy MC accession programs by comparing the retention rates of MC Officers coming from the different accession sources such as Health Professions Scholarship Program (HPSP), University of the Health Sciences (USUHS), Navy Active Duty Delayed Specialists (NADDS) and Direct Accessions (DA). It aims to understand the retention rates for the different sources of MC Officers in the United States Navy, whether it can supplement adequate long term manpower supply for the specialty. Aside from the determination of retention rates, it also studies the optimal mix of manpower personnel from different accession sources to fill billet requirements in the future.

The factors that are analyzed in the study includes the accession sources and demographic information such as gender, education level, marital status, prior service status, recruitment states and race. The data originates from Navy Recruiting Command (NRC) and BUMED, Table 5 shows the breakdown of the number of observation in both the retained and not retained category.

Table 5.   Dependent Variable Characteristics Retention Status

RETENTION STATUS	NUMBER OF OBSERVATIONS	PERCENTAGE
RETAINED ONE YEAR	2535	65.61
NOT RETAINED ONE YEAR	1329	34.39

Adapted from Juli Schmidt and Colvin Walter. "Evaluating the Effectiveness of the Medical Corps Accession Programs" (master's thesis, Naval Postgraduate School, 2012).

Explanatory variables include accession year, program of entry and demographics. The authors utilize a probit model for different categories to explain the effects of race and gender. In terms of forecasting future end strengths a Markov model is used containing data totaling 11,790 observations from cohorts since FY 81 through FY 2010.

The active duty result for the regression in the study concludes that those MC Officers from USUHS and other category such as DA and recalls are more likely to stay in the military after their original service obligation at a rate of 28%. Interestingly, prior enlisted personnel who became MC Officers are less likely to stay which is contradictory to the assumption that they are more likely to stay based on the number of years in service towards retirement as shown in Table 6.

Table 6.   Primary Model Results Primary Model—Regression Results

PRIMARY MODEL REGRESSION RESULTS		
VARIABLES	PROBIT RESULTS	MARGINAL EFFECTS
USUHS	1.1577***	0.2894***
	(0.1438)	(0.0208)
NADDS	-1.3105***	-0.4870***
	(0.0853)	(0.0282)
NADDS_1_YR	-0.7736***	-0.2962***
	(0.1043)	(0.0404)
FAP	-0.7290***	-0.2793***
	(0.1118)	(0.0436)
OTHER	0.2225*	0.0733*
	(0.1242)	(0.0384)
FEMALE	0.0547	0.0189
	(0.0648)	(0.0223)
ASIAN	-0.0006	-0.0002
	(0.1163)	(0.0406)
BLACK	0.0670	0.0230
	(0.1277)	(0.0431)
OTHER_RACE	-0.8332***	-0.3198***
	(0.1475)	(0.0565)
PRIOR_ENLISTED	-1.9582***	-0.6500***
	(0.4391)	(0.0838)

Adapted from Juli Schmidt and Colvin Walter. "Evaluating the Effectiveness of the Medical Corps Accession Programs" (master's thesis, Naval Postgraduate School, 2012).

The race model which compared HPSP and USUHS sources revealed that blacks are more likely to stay compared to Asians and other races. The gender model showed that males are 15% more likely to stay in the military compared to females in the Medical Corps. Reserve component regression results yielded inconclusive outcomes in this particular study due to insufficient data.

E.   CONCLUSION

All the prior studies show that trends and factors affecting retention are important to identify in both healthcare and non-healthcare settings. The identification of these

factors that causes one to stay or leave the military service affects new policy, ensures adequate manpower recruitment and justifies expected return on investment for money spent on training and accession efforts. General themes across the literatures showed that pay, incentives, certain demographic characteristics, quality of life, and accession sources are all significant factors. The active duty studies for officers in other specialties have had findings that can also represent a similarity to the RC in the Medical Corps. The RC Medical Corps, in its entirety, has not been the subject of a quantitative retention study, and no study has analyzed the factors and trends that contribute to the difficulty in recruitment and retention. Considering the complexity of the MC in the RC and the investment needed to ensure proper MC end strength, it is important to have current information and understanding of MC retention factors.

III.   ORGANIZATIONAL MODEL AND CULTURE

A.   OVERVIEW

This chapter aims to analyze the organizational culture and structure of NRM using a widely known theoretical model to explain alternative solutions affecting recruitment of MC in the reserves. Since the NRM purpose is to ensure adequate medical support for various missions and operations around the globe, a roadmap for understanding organizational performance is critical to its success.[38] The difficulty in the recruitment of military physicians in the RC can be diagnosed using the organizational transformational model that can either improve or change its processes. This section uses the congruence model to perform such diagnosis and help improve the organizations' ability to ease recruitment for that specialty.

B.   ORGANIZATIONAL MODEL

Resistance to change is the downfall of major organizational changes in the past decades. As a result, various organizational models which include the Congruence Model, Six Box Organizational Model, Art of Japanese Management, Organizational dynamics, and Levitt Model are used by businesses to evaluate organizational design and effectiveness when an organizational transformation is needed.[39] These models are used to diagnose organizational effectiveness to further improve their output and performance. Academic research and practical applications were performed using these models in a vast number of major companies. The approach to incorporate naturally occurring systems and human organizations started when Harvard Business School noticed a connection from environment input and other factors to produce internal transformation

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[38] Nadler, David, Michael Tushman, and Nina Hatvany. "Managing Organizations," in *Organizational Dynamics*, (New York: Columbia University Medical Center, 1980), 35–47.

[39] Frank Barrett. "Leading Organizational Change" (lecture, Naval Postgraduate School, Monterey, CA, May 2015)

of processes.[40] In this chapter the use of the Congruence Model is outlined to aid NRM in improving their performance using organizational theory.

1.   Congruence Model

The failure of an organizations' ability to change and react to its environment both internally and externally can cause numerous problems. According to Nadler and Tushman, the primary job of the management in every organization is to ensure effective operation and understanding of the behavior that influences that environment is often difficult to identify.[41] This is true and is reflected in the notion of organizational culture as one compares the analogy to an iceberg. The culture of an organization that is visible to an individual does not show the vast values and beliefs hidden under water. This model stresses the different aspects that are considered factors in the diagnosis of organization to identify such issues. Consider the work of Peter Senge in the book *The Fifth Discipline.* He acknowledges that reductionism or breaking up a whole into different components is flawed, therefore, understanding that the sum of the components is greater than just looking at the parts.[42]

The congruence model outlines relevant factors associated with input, environment, resources, history, strategy, work, formal and informal organization, people, output, system, unit and the individual in the perspective of NRM as depicted in Figure 9. Understanding and using the tool in a systematic way can identify elements that drive or hinder organizational performance. Analyzing all the factors separately at NRM can improve compatibility within the organizations culture and people. The higher the congruence the better the fit within the organization's culture and people resulting in a

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[40] "Congruence Model, A Roadmap for Understanding Organizational Performance," Mercer Delta, LLC., January 2016, http://ldt.stanford.edu/~gwarman/Files/Congruence_Model.pdf.

[41] Nadler, David, Michael Tushman, and Nina Hatvany. "Managing Organizations," in Organizational Dynamics (New York: Columbia University Medical Center, 1980), 36.

[42] Peter Senge, *The Fifth Discipline. The Art and Practice of the Learning Organization* (New York: Doubleday/Currency, 1990), 13.

better performance. Similarly when the pieces of the elements are not aligned, the friction has a negative impact on the organizational process which can hinder productivity.[43]

Figure 9.   Congruence Model
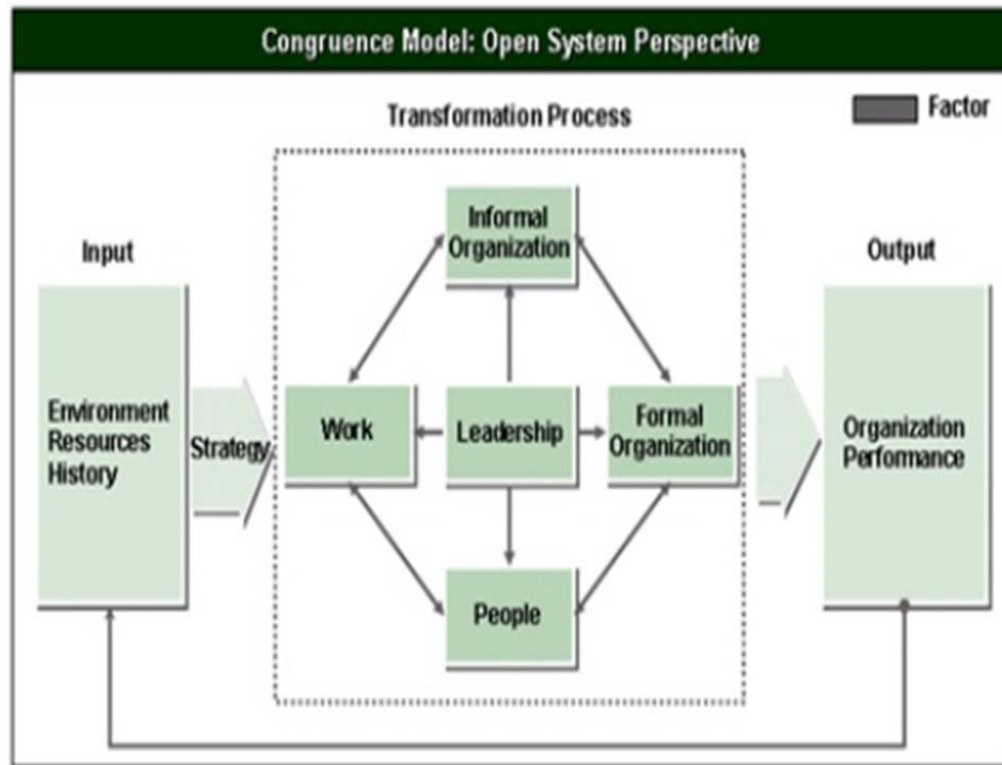
Adapted from "Congruence Model, A Roadmap for Understanding Organizational Performance," Mercer Delta, LLC, January 2016, http://ldt.stanford.edu/~gwarman/Files/ Congruence_Model.pdf.

a.   *Inputs*

The internal and external factors that the organization has to work with such as environment, resources, and history make up the inputs that the model need for the analysis of the problem.[44]

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[43] "The Congruence Model: Aligning the Drivers of High Performance," Mind Tools, March 2016, https://www.mindtools.com/pages/article/newSTR_95.htm.

[44] Nadler, David, Michael Tushman, and Nina Hatvany. "Managing Organizations," in *Organizational Dynamics* (New York: Columbia University Medical Center, 1980), 38.

(1) Environment

Trends in economics, politics, technology, and society greatly impact an organization. These factors often create demands and constraints needed in the analysis of the problem. NRM must identify environmental factors that may affect their ability to recruit physicians constantly. Some factors that may affect such recruitment efforts may include employment rates, physician supply due to forecasted aging population, technological advancements and election cycles to name a few. If the NRM recognizes low employment rates, policy changes on bonus and incentive amounts must be scrutinized to compete with the civilian sector. The supply of physicians as the population becomes older may require recruitment in the medical schools as a focus of effort. By anticipating trends that affect the problem or issue, certain actions may be done to avoid difficulties in attaining required physicians to support military missions and operations. Understanding the environmental elements that affect the organization can then provide opportunities for strategy change.

(2) Resources

The second source of input for the analysis of a problem includes the organizations' full range of asset, capital and information that can be used to identify such issues. The contribution of people or employees is oftentimes underestimated as processes and increase in tempo at work persist. This creates morale and motivation issues in the long run but by understanding that people are the number one asset can often mitigate such an issue. Another resource that must be improved and maintained at NRM involves networking. The value of having a wide array of professional networks cannot be overlooked. Keeping the image likeable for those who work or worked in any capacity can go a long way since they serve as spokespersons for those potential recruits.

(3) History

An organization that supports a great mission and vision does not evolve over night. Strategic decisions, key leaders, and crisis managers, are some of the historical factors that helped shape the values and beliefs of an organization. NRM's mission has evolved over the years and its ability to keep up with the requirements of Navy Medicine

suggests that it has a successful history. Time has shown that as the role of reservist changes from stand by support, active duty replacement and forward deployed assets are a fruit of years of great leadership and strategy management. Understanding this type of input is a must in order to reasonably predict an organization's capacity today and especially in the future. As the organization transform in response to the ever changing roles of the reserve, means that strategical changes must be expected in the future.

b. Strategy

Identification of the factors that compose a current situation is important but the strategy to address such trends weighs even more. The nature of the work and the processes are all outputs from the strategy formulated by the organization. Strategy then becomes critical and may be the most important factor that must be established to successfully direct an organizations' goal and mission towards success. Military entities such as NRM can be perceived as a well-structured organization whose processes and procedures are aligned and systematic. Often standard operating procedures dictate the way a department operates in a daily basis but knowing that a strategy that changes as the factors identified changes is needed to ensure decisions and goals are achieved.

c. Work

The basic and inherent job to be performed by the organization is the best description for work.[45] The value of understanding work is critical since this is the bread and butter of every organization. Work flows, patterns, skills, rewards and stress are some of the most scrutinized components of work. Synergy must always be present and equipping all levels of workers with the best tool often dictates success and failures. The traditional structure of work in an organization such as NRM involves echelons or hierarchies that often communicate through the leadership at each level. Changing the structure may lead through a different outcome such as direct communication inter-level that may speed up processes.

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[45] *Wikipedia*, s.v. "Work," last modified February 2016. http://en.wikipedia.org/wiki/Work.

d.   People

NRM as a huge organization ranging from top leaders at the headquarters to the recruiters at each NOSC and they all must be aligned to a common goal. Critical elements needed by recruiters in meeting their quotas must always be looked at in deeper perspective. This enables them to perform their jobs at a higher level reaping greater numbers and achieving well above their goals. Leaders also must always address types of knowledge and skills required at different jobs. They must also understand their peoples' needs such as rewards and incentives. Gauging the knowledge of the workers perception and expectations with the organization is also a must. In the age of analytics, NRM must have the capability to pinpoint trends in demographics and rate of productivity in order to leverage on strong points and address the weak ones.

e.   Formal Organization

The organizations' formal structure is made up of the systems and processes designed for each work and its people in order to achieve its mission and goals.[46] NRM as required by the DCNO to establish an annual accession plan for the RC, identify retention incentives and maximize use of different recruitment program is structured to attain end strength objectives for different medical specialties. The key element that affects the formal organization is its ability to transform based on the different inputs associated with the external and internal factors. Consideration of the elements that make up the formal organization such as the way jobs are grouped together, job design and work environment must be able to transform as the change is needed.

f.   Informal Organization

The difference between the formal and informal organization is that the first is structured and most of the time written while the latter is not. Influence that affects the individual or groups behavior makes up the informal organization. In order to ease the difficulty associated with recruitment for medical specialties, NRM must identify the relevance of the informal characteristics to the realities of the current work

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[46] "Congruence Model, A Roadmap for Understanding Organizational Performance," Mercer Delta, LLC. January 2016, http://ldt.stanford.edu/~gwarman/Files/Congruence_Model.pdf.

environment.[47] Some items that need to be considered include patterns of processes, practices, and political relationships that evolved as a result of the values and beliefs of the individuals who work in the organization.

2. The Concept of Fit

Understanding that outputs in any organization that are measured by its attainment of goals is secondary to this model. NRM always have the responsibility to achieve end strength as dictated by the need and requirement of ongoing Navy Medicine missions and operations. The application of the congruence model for this purpose exceeds that expectation since it is the blueprint for a transformation process as shown in Figure 10. Ultimately, the reason why an organization such as NRM exists is to provide output as required by a higher echelon requirement. If the model is applied and used correctly, the concept of fit then provides more than what is expected. The alignment of such components such as work, people, structure, and culture then produces a tighter fit on the solidarity in the performance of the entire organization which only results in the achievement of desired goals and expectations.

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[47] Ibid.,7

Figure 10.   Transformation Process
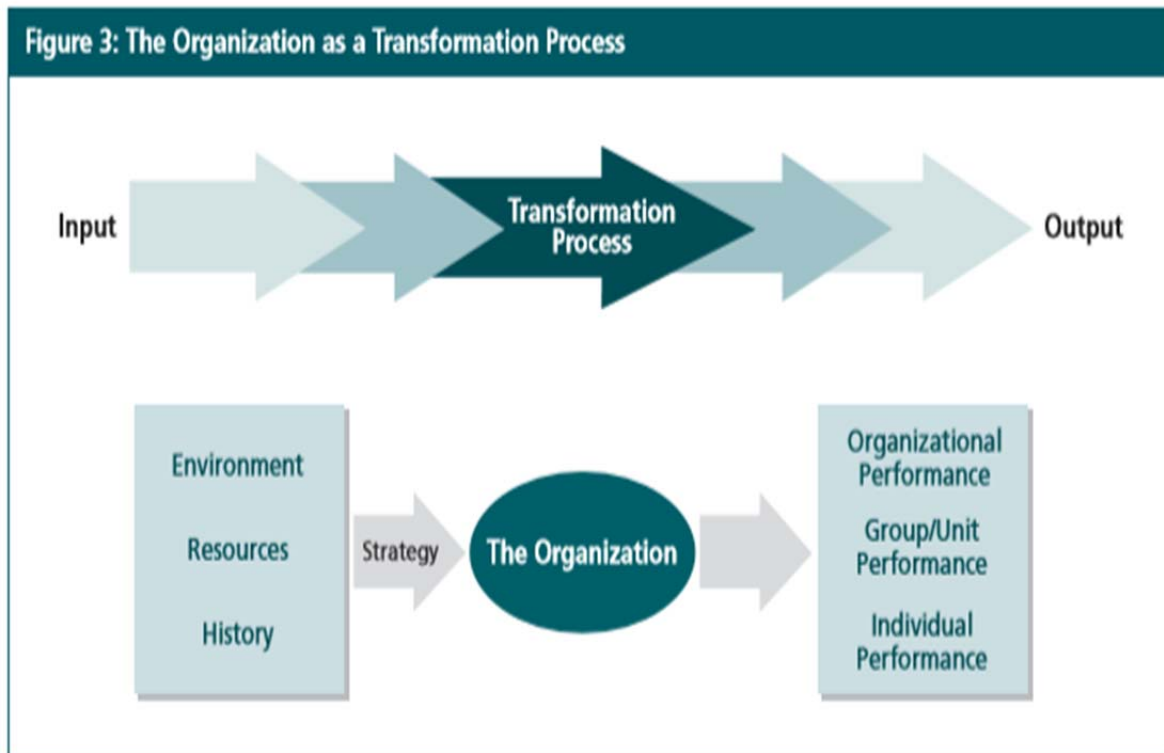
Adapted from "Congruence Model, A Roadmap for Understanding Organizational Performance," Mercer Delta, LLC. January 2016, http://ldt.stanford.edu/~gwarman/Files/ Congruence_Model.pdf.

C.   ORGANIZATIONAL CULTURE

Organizational culture can be defined as "a system of shared assumptions, values, and beliefs, which governs how people behave in organizations. These shared values have a strong influence on the people in the organization and dictate how they dress, act, and perform their jobs."[48] A strong organizational culture can thwart possibilities of complacency that may contribute to the organizations' inability to achieve its goals. According to Peter Senge, when people in an organization focus only on their position they have little responsibility for the result produced when all the position interact. And when the results are disappointing it can be very difficult to know why and just assume

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[48] *Wikipedia* s.v. "Organizational Culture," last modified January 2016. http://en.wikipedia.org/wiki/ OrganizationalCulture.

that somebody out there did not perform well. This can be avoided when the culture of the organization is optimistic, evolving and not resistant to failures.[49]

1. Right Person for the Right Job

This type of culture can be often perceived as the ideal for a military setting. But having this type of mind set often leads to a more lasting relationship within the organization and a better work environment. Many costly recruitments and waste of training dollars was a result of not finding the right person for the right job. More often filling positions and recruitment of potential personnel are accomplished based on the assumption that quotas have to be met and numbers have to be reported. But if the culture of the organization is shifted to the notion of finding the right person for the right job such waste can be avoided. Also, the quality of performance output and the quality of life within the organization can be naturally improved by having this mind set.

2. Attraction Selection Attrition (ASA) Model

The changing and strengthening of organizational culture can be achieved by having proactive leaders, culturally aligned goals and rewards, and values formation of service for country. ASA model as a theory holds that individuals are attracted to organizations whose members are similar to themselves in terms of values, interests and attributes can aid in the consolidation of organizational culture as shown in Figure 11.[50]

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[49] Peter Senge, *The Fifth Discipline. The Art and Practice of the Learning Organization* (New York: Doubleday/Currency, 1990), 18.

[50] *Oxford* s.v. "ASA Model." Last modified February 2016. http://www.oxfordreference.com/view/ 10.1093/oi/authority.20110803095433929.

Figure 11.   ASA Model
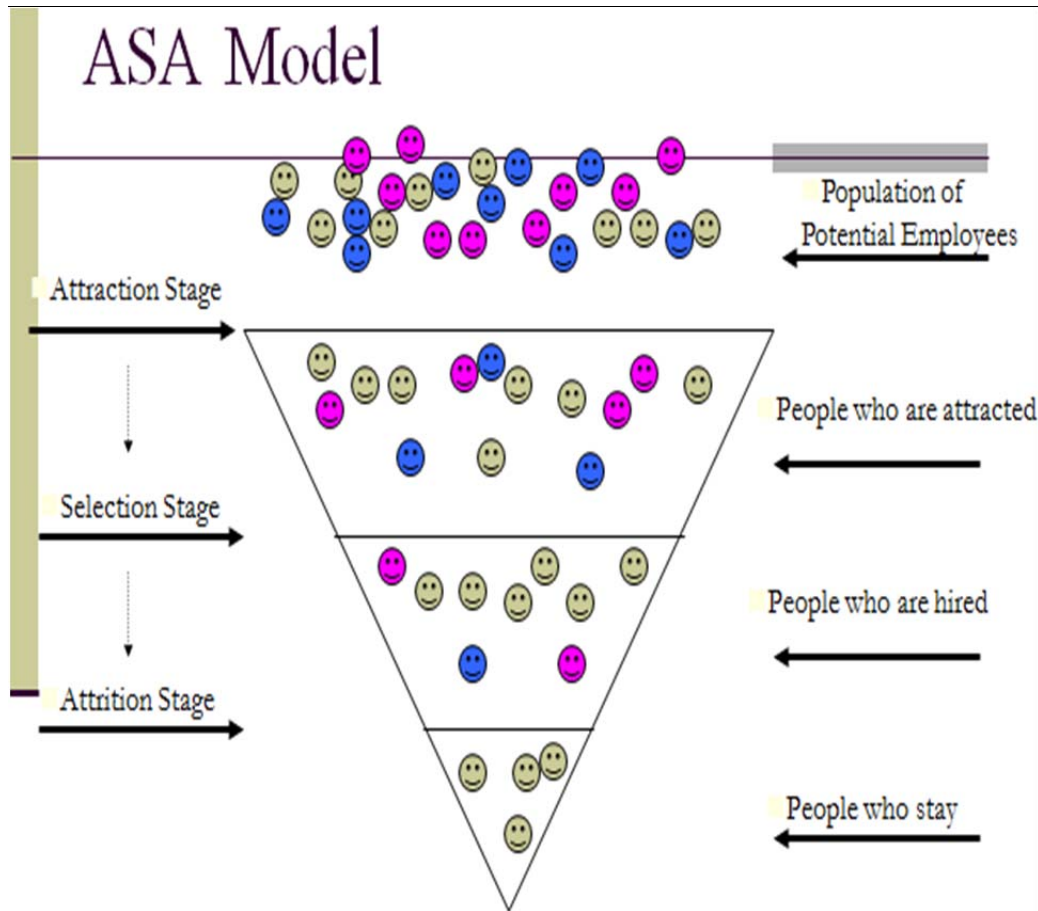
Adapted from Marco DiRenzo. "Organizational Culture" (lecture, Naval Postgraduate School, Monterey, CA, June 2014.)

D.   SUMMARY

NRM as an organization that supports the Navy as a whole must ensure that the organizational structure and culture of its people is aligned to the mission and vision of the military and Navy Medicine. The unique composition of recruits specifically the MC can pose a problem in recruitment because of the competitive market of physicians especially in the aspect of compensation. Establishing an organization whose culture reflects service to country, sacrifice, and quality of life, can aid in attracting the right people and have investment that serves a purpose rather than a liability. There are numerous organizational models that can be used to ensure that transformation when needed can be achieved. Understanding the factors that influence the internal and external

environment of an organization proves to be a vital component in this transformation process. Most of the failures that occur in any organization are contributed by resistance to change. It is indeed very easy to go through the motion of performing under the same policy and procedure for a long time and assume that the processes are still applicable. Timely determination that there is a need to transform based on factors that could be easily diagnosed using management tools such as the congruent model can improve the performance of an organization in the long run.

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IV.   METHODOLOGY AND DATA DESCRIPTION

A.   DATA SOURCE

The data used for this study were collected and constructed by the NRM at the Bureau of Medicine and Surgery (BUMED). NRM is a division of the BUMED Manpower Department that handles the MC in the RC. They provided MC data for all RC from FY 2007 to FY 2015 in Excel file format. The pay information for the military physicians is collected from DFAS and the pay information for the civilian physicians across the country was collected from the Merritt Hawkins report.

1.   DFAS

In order to manually create a military pay database the base pay and basic subsistence allowance was collected from the DFAS website from FY2010 through FY2015. A database for pay grades O-3 through O-6, from 4 years of service to 20 years and above was created to represent the military pay for MC in the RC. Not included in the database that was created are those ranks from O-1 to O-2 and O-7 above due to the lower rank obligation status and executive medicine functions for the higher rank. In order to represent comparable military pay, inputs for basic housing allowance (BAH) was included from historical data at the Defense Travel website (Defense Travel Management Office, 2015). Also included in the military pay for MC in the RC are the special pays allotted to them when activated namely ISP, BCP, ASP and VSP. Appendix A gives a breakdown of what the ISP and MSP are for each specialty by FY.

2.   Civilian Pay File

The civilian physician compensation data for FY2010 through FY2014 was obtained from Merritt Hawkins and AMN Healthcare's sister physician companies namely Kendal and Davis and Staff Care.[51] Merritt Hawkins is a national healthcare search and consulting firm specializing in the recruitment of physicians in all medical

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[51] Phillip Miller. Review of Physician and Advanced Practitioner Recruiting Incentives. Merritt Hawkins. 2014. http://www.merritthawkins.com/uploadedFiles/MerrittHawkings/Surveys/ mha2014incensurvey.pdf.

specialties and other advanced practice clinicians. They are one of the nation's largest healthcare staffing organizations and the industry innovator of healthcare workforce solutions. Annual Salary Surveys for FY2009 through FY2014 were conducted by the company in order to obtain physician pay data. They reviewed 3,148 yearly surveys to obtain physician salary for the various medical specialties and aggregated the responses to create a low, average and high salary pay for each specialty in the civilian sector. The civilian compensation total represents the physician's gross income, before taxes.

3.   BUMED

The BUMED data consisted of all MC Officers in the RC who served from 2007 to 2015, which only included the designation of 2105. Navy military physicians serving in the RC are the holder of the 2105 designation. They are further broken down into different subspecialty that makes up the MC. It also contains general demographics, pay entry base date, accession source, medical specialty, state, rank, marital status, and age. Two types of data that included important information are provided for manpower and personnel. The manpower data consisted of information that are focused on the available billet that NRM currently have for RC in each FY. On the other hand, the personnel data is composed of specific billets that are currently filled by NRM. Both, however, contain similar data needed to analyze trends and factors using different techniques. The dataset for our sample is made up of approximately 7,000 observations between FY 2007 to FY 2015. In order to eliminate blank data on some entries due to transfer of personnel, the total sample size was reduced to 2,767 due to the elimination of such incomplete data entry and duplicate information per FY.

Table 7 shows the general descriptive statistics of MC within the RC from FY07 to FY 15 provided by BUMED.

Table 7.   Characteristics of Medical Corps Officers in the Reserve
Component from FY07 to FY15

Characteristics	Reserve Component N=2,767
Accession Sources:	
Direct Commission Officer (DCO)	75.8%
Career Transition Officer (CTO)	24.2%
Gender:	
Female	12.5%
Male	87.5%
Marital Status:	
Married	80.6%
Single	13.7%
Rank:	
CAPT	36.6%
CDR	43.4%
LCDR	18.1%
LT	1.8%
Age:	
40 Y/O and below	4.2%
41 to 59 Y/O	68%
60 Y/O and above	20.4%
Region:	
West	26.4%
Midwest	17.3%
South	33.6%
Northeast	22.6%

Most of the MC in the RC in the data provided by BUMED are from the Direct
Commissioning Program (DCO) (75.8%), male (87.5%), married (80.6%), holding the
rank of CDR (43.4%), between the age of 41 and 59 (68%) and mostly recruited in the
Southern region (33.6%).

B.   METHODOLOGY AND DATA ANALYSIS

1.   Overview

In order to conduct a comprehensive military and civilian physician pay analysis,
a database was created to show numerous pay information derived from DFAS and the
Merritt Hawkins report in 2014. The military pay database for MC in the RC includes
base pay and basic subsistence allowance (BAS) from fiscal year 2010 to 2016. The

database created was composed of O-3 through O-6, from 3 years to 20 years of service. Since O-1's and O-2's are still in obligated status they were not included in the analysis. Other factors included in the military salary are BAH, bonuses, hazard pay, family separation allowance and hostile fire pay. MC in the RC is entitled to many types of Special Pay as outlined in OPNAVINST 7220.17. In order to compensate for the deficiency in the military pay for the physicians in certain specialties, the ISP, BCP, ASP and VSP are added to their total pay in a prorated system if activation is under 1 year, and lump sum if greater than or equal to 1 year.

The Merritt Hawkins report for 2014 is a survey of physician salaries in the country. The survey includes 3,158 permanent and advance practitioner physicians that staffed hospitals within the 50 states during the 12 month period from April 2013 to March 2014.[52] Base salary for 20 specialties was included in the report ranging from low, average and high as shown in Table 8.

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[52] Ibid.

Table 8.   Merritt Hawkins Medical Specialty Report

	2013/14	2012/13	2011/12	2010/11	2009/10
Family Medicine (Includes FP/OB)	714	624	631	532	375
Internal Medicine	235	194	235	295	246
Hospitalist	231	178	155	160	124
Psychiatry	206	168	168	133	179
Nurse Practitioner	128	69	23	N/A	N/A
Pediatrics	92	87	70	64	84
Emergency Medicine	89	111	106	92	116
OB/GYN	70	77	81	80	69
Physician Assistant	61	50	22	N/A	N/A
Neurology	61	71	41	79	49
General Surgery	58	74	130	69	61
Orthopedic Surgery	58	57	105	104	88
Gastroenterology	54	37	51	32	41
Hematology/Oncology	50	45	53	35	21
Otolaryngology	32	40	40	31	32
Cardiology	32	38	46	26	58
Urology	29	26	57	56	44
Neurosurgery	20	23	12	7	11
Pulmonology	18	24	68	32	32
Endocrinology	17	22	16	14	18

Adapted from Merritt Hawkins, "2014 Review of Physician and Advanced Practitioner Recruiting Incentives," February 2016, http://www.merritthawkins.com/uploadedFiles/ MerrittHawkings/Surveys/mha2014incensurvey.pdf.

Since the organization encounters recruitment difficulties in the MC, a forecasting model is also used. A forecasting model that predicts some future difficulties is implemented. The NRM provided two types of data that included authorized billet and actual personnel billet between FY07 to FY15. The information can be used to forecasts future unfilled billets which may be critical to many opportunities for planning and decision making.

2. Methodology

Physicians bring into the labor force a unique set of abilities and skills. Such capital is an accumulation of years of education, experience and training that can be perceived as investments in human capital. The medical occupation then becomes a tool brought about by costs incurred in the near term due tuition fee, books and other school expenses. Eventually the benefits or economic returns are recouped in the long run by acquiring competitive salaries both in the civilian and military sector.

a. Civilian and Military Pay Analysis

The study for pay gap examines the effects on recruiting difficulties for Navy physicians at their decision point in all specialties. Military recruiting and retention are responsive to the level of military pay relative to civilian sector wage opportunities.[53] There are two main sources of RC in the MC which is the Career Transitioning Officer (CTO) and Direct Commission Officer (DCO). CTO are those military personnel who came from active duty but did not retire or are not receiving retirement pay. DCO are those who graduated from medical schools or actual physicians from the labor market who wishes to serve in the RC.

The database used for the study compiled pay information from DFAS. The excel spreadsheet from the database has information about the base pay and BAS from FY-09 to FY 16. Since the Merritt Hawkins survey reported salaries ranging from low, average and high across the nation, the database seen in Table 9 use a comparison base pay for O-3 with greater than 3 years for low civilian physician. The average civilian physician

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[53] John Warner. The Effect of the Civilian Economy on Recruiting and Retention, 71. http://militarypay.defense.gov/Portals/107/Documents/Reports/SR05_Chapter_2.pdf.

comparison in the table is composed of O-5 with greater than 12 years of service and the high salaried civilian physician is compared to an O-6 with greater than 18 years in service. Those in the rank of O-7 and above was not included due to their executive medicine position in the military and therefore assumed that they do not have clinical work but purely administrative.

Included in the database are incentive pay amounts from DFAS and OPNAVINST 7220.17. The amount of bonuses that was derived specifically includes ISP, VSP, ASP and BCP since according to instructions are available to the RC of the MC. Computation for such incentives varies on the database since ASP and ISP are given as a lump sum amount annually while the VSP and BSP are given monthly. Also, the amount given to the RC officer is dependent on the amount of time that a RC officer is activated to AC status. If the orders is greater than one year therefore all the incentives pay are given as a total amount. If the orders are less than a year only the BCP and VSP are given since the requirement for the other bonuses is an activation of greater than or equal to one year.

Deployment is also factored in the database in the event that a RC is activated to deploy OCONUS in a hostile area such as Iraq and Afghanistan. Some of the pay that is eligible for the MC in the RC includes family separation allowance, hostile fire pay, hazardous area pay and additional subsistence allowances.

In terms of DCO analysis comparison with the civilian workforce, databases which includes sign on bonuses, monthly stipend while in training and loan repayment incentive where also added. Normally, if a physician elects to join the MC in the RC they are eligible to receive a sign on bonus amount that is approved for that certain year. Also, a monthly stipend of approximately $2K per month is given for some training needed for certain critical specialty in the reserves. The loan repayment program covers an amount not to exceed $50K when a Physician who incurred Medical School debt enters the Reserves.

Table 9.   Civilian and Military Pay Gap Table

	Low	Average	High
Emergency Medicine	$ 79,250	$ 132,634	$ 228,686
Family Medicine	$ 28,250	$ 50,834	$ 129,286
General Surgery	$ 109,250	$ 193,234	$ 302,686
Internal Medicine	$ 36,250	$ 66,634	$ 149,686
Neurosurgery	$ 427,147	$ 515,215	$ 645,022
OB/GYN	$ 88,250	$ 133,834	$ 201,686
Orthopedic Surgery	$ 200,250	$ 355,634	$ 565,686
Otolaryngology	$ 148,250	$ 233,634	$ 352,686
Pediatrics	$ 27,060	$ 49,772	$ 88,366
Psychiatry	$ 53,250	$ 83,234	$ 143,686
Pulmonology	$ 100,250	$ 191,834	$ 273,686
Urology	$ 231,250	$ 306,034	$ 433,686

b.   *Scenario-Based Cost Comparison*

The majority of the analysis is approached with the use of Net Present Value (NPV) where discounted future returns are compared with discounted costs.[54]

$$\frac{R_1 - C_1}{1+r} + \frac{R_2 - C_2}{(1+r)^2} + \frac{R_3 - C_3}{(1+r)^3} + ... + \frac{R_T - C_T}{(1+r)^T} > 0 \tag{1}$$

If NPV is greater than zero over a period of time then the notion of investing on additional human capital is expected. Also, the investment model suggests that higher future earnings, productivity and job satisfaction is incorporated in the returns of an NPV with a greater than zero.[55] As a factor in the formula for NPV, discount rate (r) states that the higher the preference for current consumption relative to the future the higher the (r) is. Opportunity costs are also taken into consideration in the analysis since the

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[54] Gregory G. Mankiw, *Principles of Economics, 7th Edition*. (Cincinnati, OH: Southwestern College Pub., 2014)

[55] Ibid.

comparison of wages between the military and civilian physician takes into account foregone earning when activated in the RC.

The scenario based cost comparison is constructed into several scenarios of activation in the RC for a military physician. The first scenario used to make an analogy between military and civilian pay involves decision making points for a Family Medicine (FM) Physician. The analysis focuses on a FM physician who decides between serving in the RC or working solely in the civilian sector as a physician. The study conducted expands over a 5 year time period where the DCO elects to receive a sign on bonus and monthly allowance during 6 month required training. A maximum of $50K is also received during the entry to RC. The scenario includes the civilian sector annual pay for FM at a low rate since the member is a new graduate. Drill pay and 2 week training pay required per year for RC is also included in the analysis. The discount rate used is 10%.[56]

The worst case scenario analysis used in the study incorporates situations that affect the recruitment for such an occupation in the military. An MC in the RC can be activated to replace active duty personnel within the continental U.S. (CONUS) duty station depending on the necessity for such a specialty. The big three hospitals in CONUS are located in California, Maryland and Virginia where capability that matches high end hospitals in the U.S. is comparable. Some specialties are scarce in the MC therefore in a worst case scenario setting where an RC officer is activated to AD for 3 years is used as a comparison. Another scenario added to reflect deployments in hostile or hazardous area is also used in the analysis. Assuming that a member of the MC in the RC could be deployed to a major conflict area once per paygrade, the rank used in the analysis is O-4 with over 8 years of service to be compared with a low-level civilian physician, O-5 with greater than 12 years of service in the military for the average comparison, and O-6 with greater than 18 years of service for the high salary comparison.

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[56] John T.Warner and Saul Pleeter. "The Personal Discount Rate: Evidence from Military Downsizing Programs.," *The American Economic Review* 91(1): 33–53. http://www.jstor.org/stable/2677897.

c.   *Forecasting Model*

The forecasting model formally interprets patterns in the data and expresses a statistical relationship between past and current values of the variable.[57] Manpower and personnel data such as recruiting often shows unfilled authorized billets. The data provided by NRM showed this issue in a monthly snapshot between FY07 to FY15. The higher the anticipated unfilled billets are projected the need for more planning and strategizing to address such an issue must be performed.

Time series analysis discovers a pattern from past data values that are extrapolated into future forecasts. According to Cengage learning, "Quantitative forecasting methods are used when past information about the variable being forecasted is available, the information can be quantified and it is reasonable to assume that the pattern of the past continues in the future."[58]

The model used in forecasting unfilled billets in the RC includes the autoregressive moving average (ARIMA models) and exponential smoothing models. The appropriate model is dependent on the behavior of the data being analyzed. Some of the behavior that is considered includes stationarity, trend, seasonal adjustment and correlation.

In this analysis, we use JMP software package to forecast future unfilled billets in the MC at NRM. The final result being the solution with the best fit for the data are determined based on Akaike's Information Criterion (AIC), distribution and pictorial correlation of residuals and predicted values.

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[57] Jeffrey Hyink. "Manpower Model" (lecture, Naval Postgraduate School, Monterey, CA, June 2015).

[58] "Time Series Analysis and Forecasting," Cengage Learning, February 2016, http://www.cengage.com/resource_uploads/downloads/0840062389_347257.pdf.

V. RESULTS OF ANALYSIS

A. OVERVIEW

This chapter presents the results of the cost analysis incorporating several scenarios for the RC in the MC.

B. COST ANALYSIS

The affiliation of physicians in the MC of the RC is directly affected by the salary offered in the civilian sector. In order to determine required policy changes in terms of incentives and bonuses offered for recruitment it is important to analyze different conditions that may affect recruits decision to affiliate. The cost used in the study is based on FY10 to FY15 data from DFAS and the Merritt Hawkins report of 2014. Military pay includes the base pay, BAS, BAH and special pays as outlined in OPNAVINST 7220.17 while the civilian physician pay is based on the low, average, and high salary range for medical specialties in the U.S.

1. Civilian Military Pay Gap

The MC in the RC that chooses to be affiliated in the military is required to drill once a month and participate in two weeks training every year. The military instruction that governs their pay indicates that drill pay is to be based on the rank and years of service. Also, in terms of special pay and incentive, military RC physicians must be activated for at least one year or their special pay is pro-rated if activation is less than a year.

The Merritt Hawkins report incorporated physician salary in a scale of low, average and high between years 2010 to 2014 within the fifty states. The low salary is compared to entry level military physician in the O-3 paygrade with at least 4 years of service. This comparison reflects a competitive analysis from a low salaried physician in an entry level after medical school. The analysis showed that the military doctor is activated for a year and is receiving ASP, ISP, BCP and VCP which makes them entitled

for the special pay per Navy instructions.[59] The activation of the RC is assumed on this scenario to be not continuous but rather occurring in different years for a total of 5 years. The cost analysis showed that at a low level there has been an increase of 31% in the salary gap for physicians between the civilian and the military in a span of 4 years where the civilian sector pays higher than the military. Figure 12 results is based on the salary gap for military and civilian physician across 10 specialties which include Emergency Medicine (EM), Family Medicine (FM), General Surgeon (GS), Internal Medicine (IM), Obstetrics and Gynecology (OBGYN), Otolaryngology, Pediatrics, Psychiatry, Pulmonology and Urology.

Figure 12.   Low Level and O-3 Pay Comparison
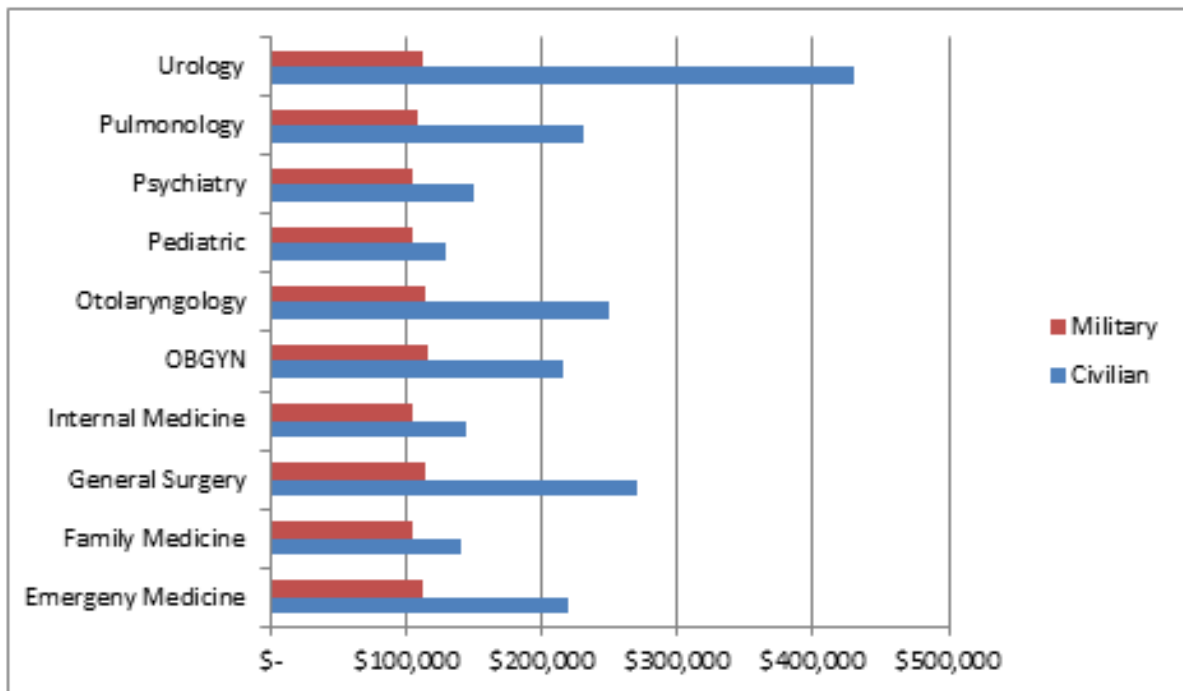
The average level comparison for the report of salaries for civilian physicians is compared to an O-5 military with at least 12 years of service. This is highly comparable to civilian counterparts who are receiving an average physician salary. Using the same

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[59] Deputy Chief of Naval Operations. *Special Pay for Medical Corps, Dental Corps, Medical Service Corps, and Nurse Corps Officers.* OPNAVINST 7220.17. December 28, 2005. http://www.med.navy.mil/ bumed/Special_Pay/Documents/HomeLinks/References/OPNAVINST%207220.17.pdf.

specialties and by computing the gap between the salaries provided to the civilian physicians between 2010 and 2014, the analysis shows that there is a 12% increase in the salary gap. Figure 13 result is consistently showing that the civilian sector is receiving higher salary in all those specialties for the past 4 years. This outcome may be due to the steady increase of physician salaries as a result of the aging population and the need for steady increase in the supply of physicians according to the report of the USDHHS in 2005.

Figure 13.   Average Level and O-5 Pay Comparison
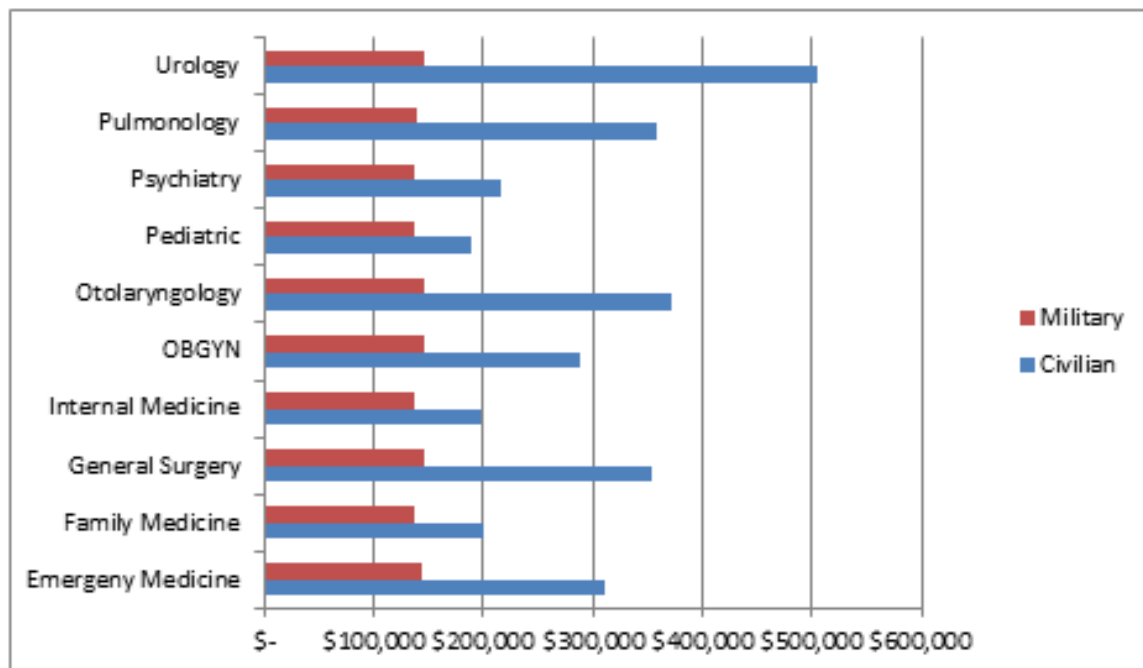
The high-level comparison in Figure 14 shows the least amount of change in the gap at 5.3%. The comparison of the civilian sector was compared with a military officer at the rank of O-6 with greater than 18 years of service. The Merritt Hawkins report indicated that there is a slower increase in the salaries for 5 of the 10 specialties of civilian physicians. The increase in demand for physicians as the population becomes older showed a spike in the need for more recruits. Most of the increase was seen in the

low and average salaried physician since this is where the majority of the pool of assets is needed.[60]

Figure 14.　High Level and O-6 Pay Comparison
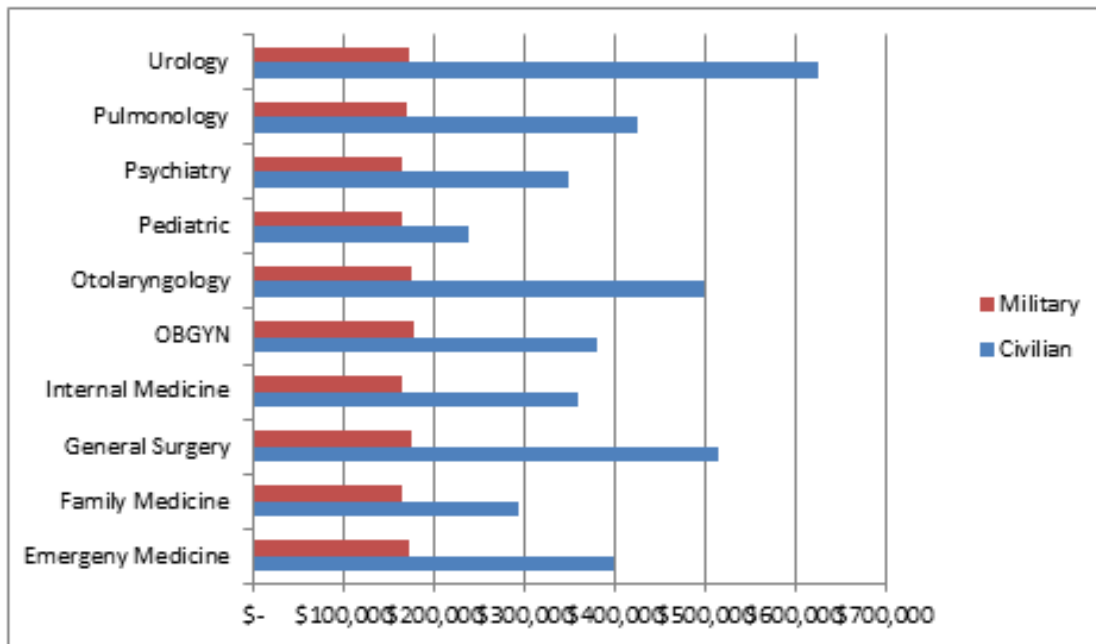
Overall, the civilian and military pay gap in the medical field has been growing in the last 4 years. Various factors may contribute to the constant increase in the salaries for civilian physicians. The rising health care cost is a big factor, the increasing aging population and emerging technological advancement.[61] This may suggest that due to the increasing demand for healthcare, the field for physicians continues to be marketable and competitive especially in terms of wages

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[60] "Physician Supply and Demand: Projections to 2020." U.S. Department of Health and Human Services, October 2006. http://bhpr.hrsa.gov/healthworkforce/supplydemand/medicine/physician2020projections.pdf.

[61] Ellen Lanser. Our Aging Population: Implications for Healthcare Organizations. *Healthcare Executive* 18 (February 2003): 6–11. http://connection.ebscohost.com/c/articles/8755371/our-aging-population.

C.   SCENARIO BASED COST COMPARISON

The scenario based cost comparison is a tool to better understand the decision making process determines whether a potential recruit joins or affiliates with the MC in the RC. By understanding the different scenarios that an MC in the RC faces may show the difficulties in the recruitment effort of potential candidates. It may also become a selling mechanism to persuade civilian entry level physicians and medical school graduates to understand the advantage and disadvantage of joining the military service. The NPV's discount rate is 10% since individuals tend to discount a larger amount of money with higher rates than those with lesser amount in terms of the sign on bonus. Military officers tend to have lower discount rates than enlisted personnel which are well above the range of 30 to 50%.[62]

1.   DCO vs. Civilian Physician

The majority of the DCO in the military may come from medical school graduates or practicing physicians who already have the certification. The scenario that involves this cost analysis is designed for a DCO who joins the reserve with a Family Medicine specialty. There are several incentives associated with this type of recruitment which includes a sign on bonus of $20K and a monthly stipend of over $2K for each month of needed training. In the computation it is also included that the DCO receives a Navy O-3 pay and is eligible to receive a maximum loan repayment amount of $50K for any remaining educational debt. In order to capture the value of investing in the present by joining the RC, the DCO is compared to a civilian physician in an entry or low level salary since it is assumed that the member is a new entrant. The result of the analysis in Figure 15 shows that by accepting a commission in the MC of the RC a DCO receives $219K more than the civilian counterpart in Year 5. Therefore, it is beneficial to join the military and receive compensation to pay for the education debt early in a physicians' career.

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[62] John T.Warner and Saul Pleeter. "The Personal Discount Rate: Evidence from Military Downsizing Programs," *The American Economic Review* 91(1): 33–53. http://www.jstor.org/stable/2677897.

Figure 15.   DCO vs. Civilian Physician (Five-Year Period)
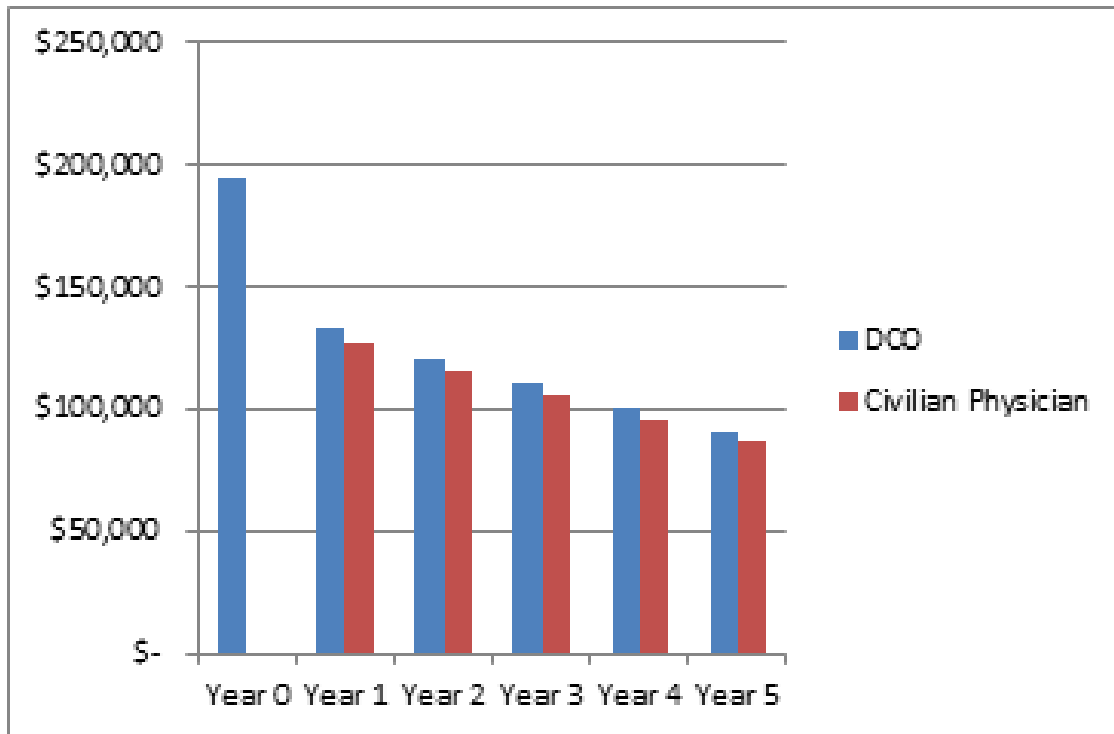
2.   MTF CONUS Activation

A worst case scenario is used as a method to compute NPV for an affiliate or recruit who joins the SELRES in the MC. The DCO has a rank of O-4 with at least 8 years in service and the civilian comparison has a specialty in General Surgery. In this case, since the DCO is activated greater than 1 year all the incentives applicable for the RC are available. ASP, BCP, ISP and VCP are added in the computation for a span of 3 years. Also the DCO receives compensation for his or her housing allowance. The low level salary for a General Surgeon in the civilian sector is $270K. The findings on the analysis in Figure 16 shows a discrepancy of almost $348K lost in the physicians' salary if a worst case activation happens in his career as a member of the MC in the RC.

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Figure 16.   Three Years' MTF CONUS Activation
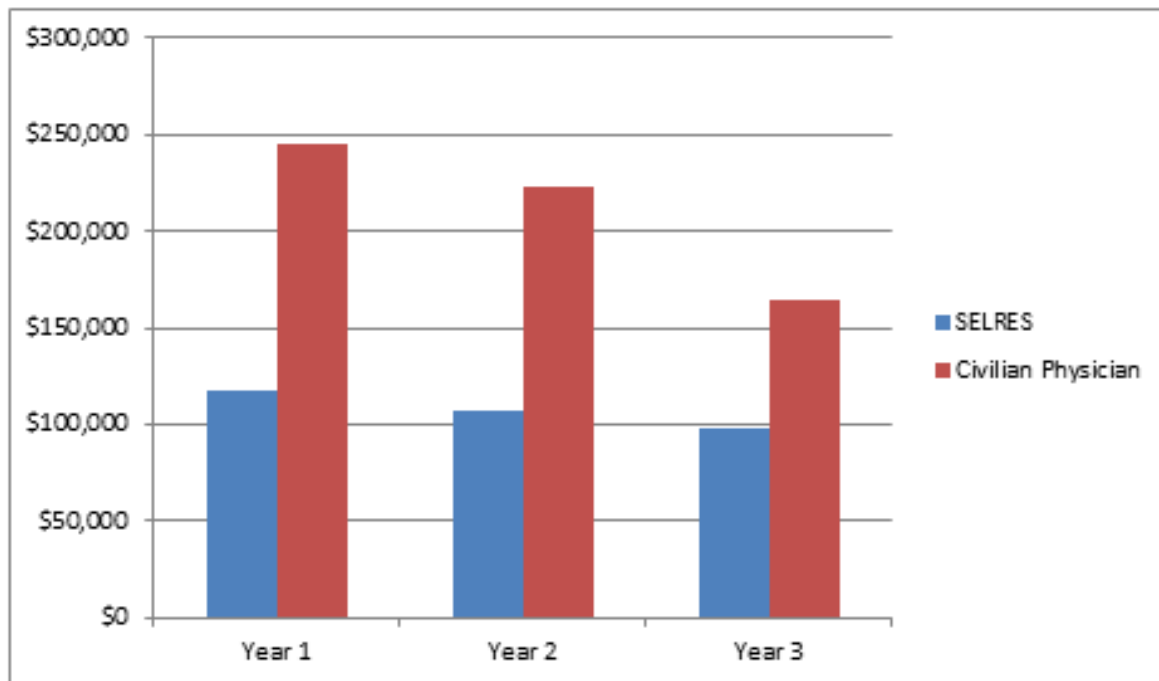
3.   Deployment

The analysis for the deployment scenario cost comparison analyzes a General Surgeon who deployed three times in his or her career. Therefore, a rank of O-4, O-5, and O-6 is used to represent the deployment frequency in each of the members' rank. In this computation a series of extra pay such as FSA, Subsistence and hostile fire pay is added to the total income of the SELRES. Also, the assumption that the member is activated for more than a year is given in order for the special pay to be included in the study. The amount indicated for the BCP, ASP, ISP and VSP is variable which corresponds to the value applicable for the year and rank of deployment. The result of the analysis in Figure 17 also proved that the civilian and military pay gap continues to negatively impact the decision of potential recruits. In this case the gap in a span of 3 years equates to almost $457K.

Figure 17.   Three Years' Deployment At War Zone
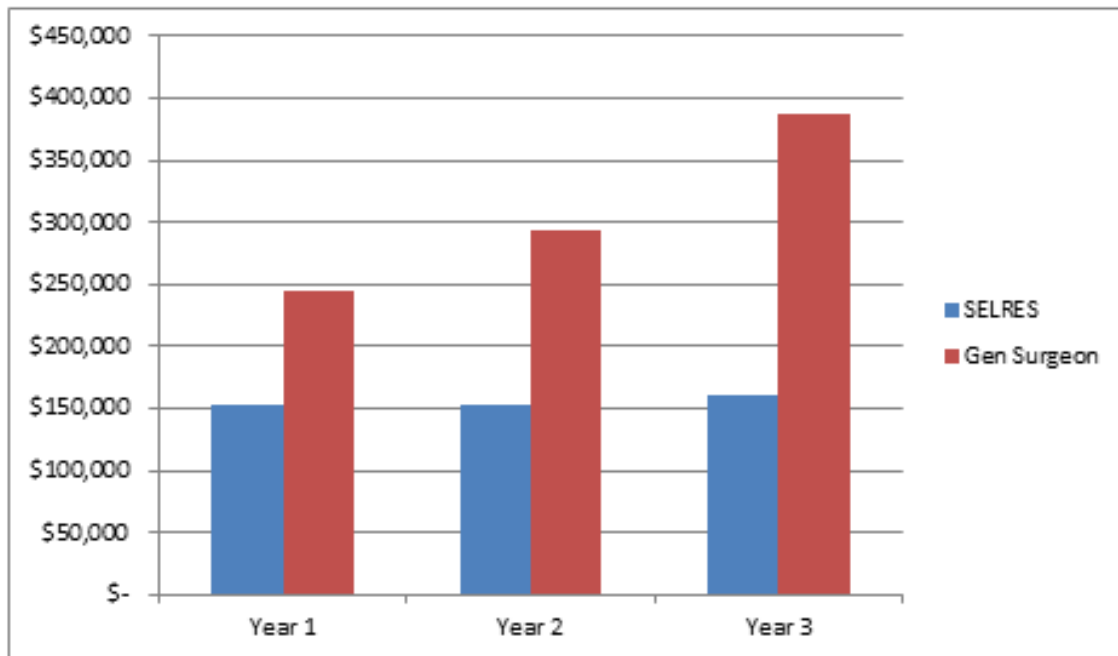
D.   FORECAST RESULT

Manpower and personnel data from BUMED shows unfilled billets for each of the last 96 months because of the difficulties in recruiting physicians faced by NRM. The number of MC Manpower authorized billets between FY07 and FY15 is approximately 6,300 and the actual filled billets number approximately 4,500. In this section, we build a model to predict the next twelve months of unfilled MC billets in the RC.

Figure 18.   Unfilled Billet Forecast (Actual and Predicted Unfilled
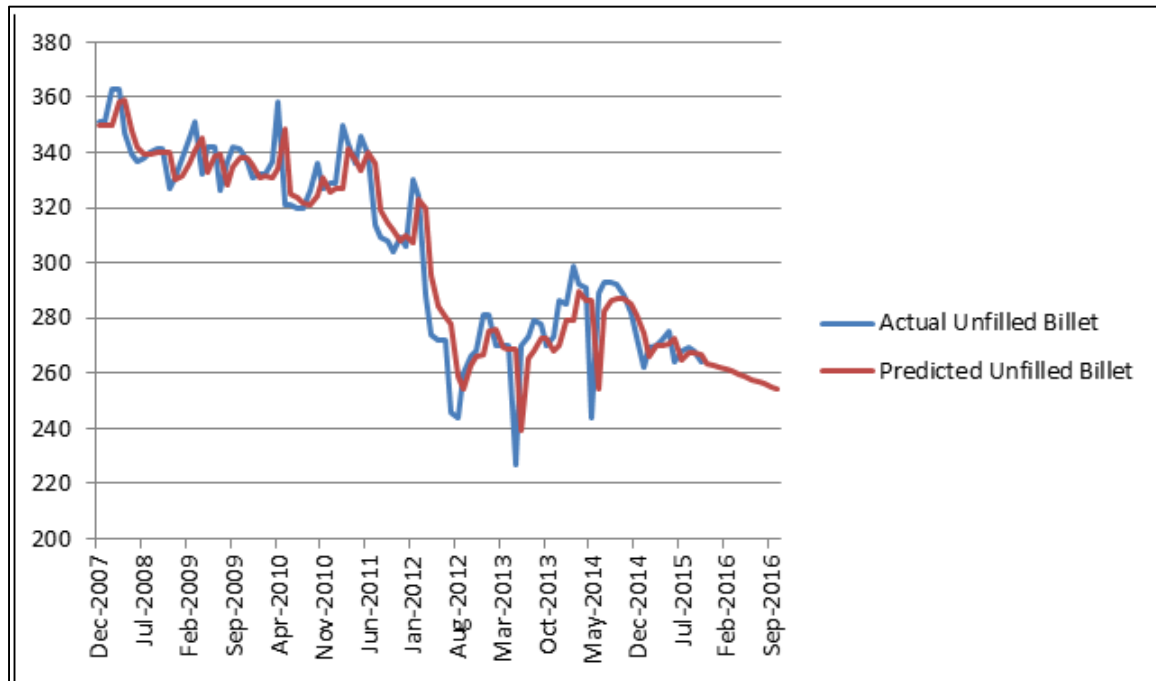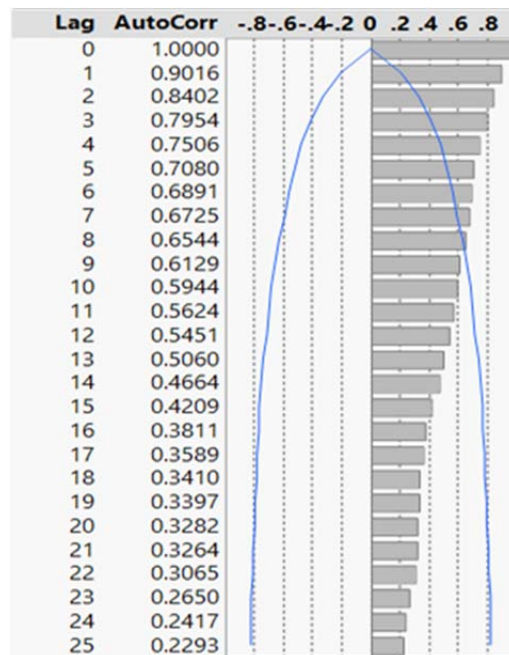Billet FY07 to FY16)

Figure 19.   Data Autocorrelation Output from JMP

The time series analysis from the monthly data of unfilled billet of MC in the RC
is not stationary due to trend. The trend is evident in both the time plot (Figure 18) and

the Autocorrelation Function (Figure 19). Autocorrelation Function in Figure 19 shows statistically significant at lags 1 to 9 indicating that there is a trend in the data. We fit an ARIMA (1,1,1) with parameters shown in Figure 20. Analysis of the residuals shows constant variance, normal distribution and independence as shown in Appendix C.

Figure 20.   ARIMA Model Parameters

Term	Lag	Estimate	Std Error	t Ratio	Prob>|t|	Constant Estimate
AR1	1	0.4828580	0.1911738	2.53	0.0133*	-0.4766336
MA1	1	0.7997460	0.1363093	5.87	<.0001*	
Intercept	0	-0.9216687	0.5224371	-1.76	0.0810	

It is estimated that in FY16 an average of 253 billets will not be filled and suggests that the difficulties in the recruitment of MC in the RC will continue to be an issue for NRM in FY16.

Figure 21.   Unfilled Billet Forecast (11 Month Period)
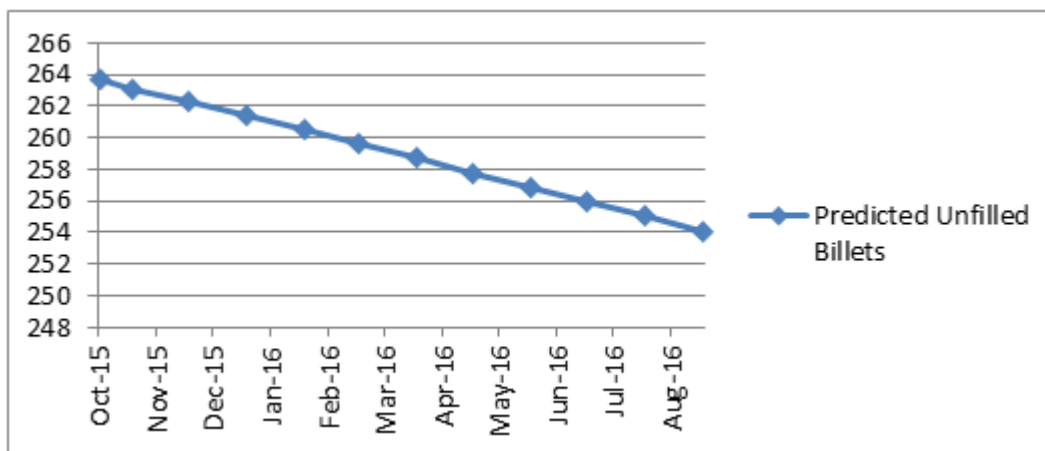
The model predicts that the number of unfilled billets in the next 11 months of FY16 is likely to remain around 250 to 265 (see Figure 21). The problem of recruiting MC in the RC continues to persist over time based on the forecast model.

E.   SUMMARY

The civilian and military pay gap for physicians studied across 10 specialties, which included Emergency Medicine (EM), Family Medicine (FM), General Surgeon (GS), Internal Medicine (IM), Obstetrics and Gynecology (OBGYN), Otolaryngology, Pediatrics, Psychiatry, Pulmonology and Urology shows a discrepancy that may be unfavorable to a potential recruit to join the RC. A low level civilian physician comparable to an O-3 in the military showed a disparity of 31% which is the highest among the category of pay. The average level physician compared to an O-5 has a gap of 12% and the high paying physician in the civilian sector compared to an O-6 has a gap of 5.3%. The gap may then indicate why there is an existing problem or difficulty in the recruitment of professionals in this sector to join the reserves.

The cost analysis for the different worst case scenarios showed interesting results; the decision making process always points out the worst cases compared to the normal scenario of drilling twice a month and training two weeks per year. The result for the DCO recruit who elects to receive loan repayment bonus showed a greater than $200K increase in income for a period of 5 years compared to a civilian entry-level physician. The MTF tour for 3 years and deployment for 3 different time horizons negatively impacted the potential income for physicians who would join the service with a General Surgery specialty. The negative income of $270K and $150K was computed based on NPV.

The recruitment difficulties in the RC continue to persist in the coming years as shown in the forecast model. Therefore, a much more thorough planning and action toward achieving quotas to fill billets must be aggressively considered.

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VI. SUMMARY, CONCLUSION AND RECOMMENDATION

A. SUMMARY

The NRM has the lowest recruitment numbers for MC compared to the other military services.[63] Although the number of MC Officer in the RC is constantly low, tremendous difficulty toward the recruitment effort in meeting accession goals continues to persist. The SELRES accession plan for MC in the RC tends to be at the low 100 personnel with an upper band of mid-100 recruitment goals per FY.[64] As the MC in the RC evolves to a more challenging role significant change is a must in terms of organizational structure. A more aggressive strategy needs to be in place to address such changes so that organizational structure aligns with the changes in the environment. The MC deploys to forward missions more frequently than before the war in Iraq and Afghanistan therefore filling critical billets to supporting Navy Medicine missions. The competitiveness of civilian sector healthcare poses a challenge in the recruiting of physicians choosing military service. So the timely need for organizational change in the recruitment strategy is immediate. To address this dynamic environment the MC in the RC should re-align recruitment strategy across all levels in the organization. The use of cost analysis as a tool to improve competitiveness of benefits and incentives could make recruiting easier. Keeping the amount of pay and incentives offered to a highly specialized profession unchanged could contribute to the problem of filling billets in the MC of the RC. A trend analysis to predict future recruitment difficulties may support the MC in addressing such an undertaking.

B. CONCLUSION AND RECOMMENDATION

The difficulties of recruiting in the MC of the RC is analyzed using two methods: (1) an organizational diagnosis using a transformation tool; (2) a cost analysis using pay

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[63] Office of the Under Secretary of Defense for Personnel and Readiness. *Defense Manpower Requirements Report Fiscal Year 2011–2015* (Washington, DC: Program and Budget Coordination Office, 2015).

[64] James Clearwood, FY 10–15 SELRES Accession Plan, email discussion with author December 2015.

gaps and scenario based cost comparison to pinpoint factors that may affect the decision of a physician to join the RC.

This section discusses the findings for the research questions in the study.

1. What Are the Underlying Causes of Recruiting Difficulties in the Navy RC in the Medical Corps?

a. *Conclusion*

The cause of recruitment difficulties facing NRM is derived from organizational structure and policies regarding pay for the MC in the RC. The changing role of the RC and the organizational goals must be congruent therefore a change is constantly needed to address such an issue in aligning mission with recruitment goals. Many types of military careers exist but that of the MC is complicated and unique. The competitiveness of the medical profession contributes heavily to this dilemma. Therefore, a more proactive approach in adjusting recruiting policies and procedures is important.

b. *Recommendation*

NRM must continue to include the subtle value of identifying various economic, societal and political factors as part of a strategy that affect both the internal and external MC organization is required. These factors maybe political, economic, or social that may provide signals on what accession programs to use for recruitment of MC. Medicine as a specialty that is of high value and demand in the civilian sector requires a more aggressive approach in terms of planning and strategizing for recruitment. NRM should continue to monitor the factors that may affect supply and demand of MC Officers. Another avenue to consider is the widening pay gap that has negatively impacted the appeal of military service. Policy changes that allow MC to receive incentives based on years in service rather than period of activation may improve recruitment in such a profession.

2.   How Does Civilian and Military Pay Gap Affect Recruitment and Affiliation of MC in the NRM?

a.   Conclusion

A cost analysis shows that there is an increasing salary gap between civilian physicians and military physicians. The effects on the recruitment are negative since the gap ranges from 5.3% to 30% across different medical specialties. The most promising source of recruitment based on the analysis is the NPV computation for a DCO compared to an entry level civilian physician. In a 5 year period, a DCO who elects to join the reserves and maximize incentives in the loan repayment program has a higher income of over $200K. The result gathered from the worst case scenarios of MTF tour and deployment shows a negative impact on the possibility of recruiting potential candidates.

b.   Recommendation

NRM should focus on recruiting entry level physicians who needs educational loans. The cost analysis proved that they are more likely to generate more income if they elect to join the military service as a reservists compared to their civilian counterpart. This can be used as a mechanism to entice potential recruits to join the MC in the RC.

3.   What Organizational Theory and Design Can Realign NRM Personnel to Establish a Culture That Will Aid in Achieving Their Goals?

a.   Conclusion

The Congruent model as a tool used for organizational transformation greatly helped identify the elements that may affect and contribute to the difficulties of recruitment. Alignment of organizational components such as work, people, structure and culture produces a tighter fit performance and solidarity in the entire organization. The transformation process using this model may unearth factors and trends that affect the organization as a whole. The identification of such factors helps change processes that are not applicable as the environment that affects the organization changes through time.

b.		*Recommendation*

NRM must develop a personnel strategy and culture for all levels of the organization to find the right person for the right job. This would create a ripple effect that may spread a positive outlook on the image of the organization and subsequently improve the recruiting environment .

### 4.		How Does Adjusting Special Pay Incentive Affect Affiliation?

a.		*Conclusion*

An examination of the civilian and military physician pay gaps identified a disparity that may affect the decision of potential recruits. The civilian sector continues to increase salary for this specialty based on the demand as the population becomes older. Looking at the VSP, BCP, ISP and ASP alone in a span of 5 years in DFAS, the value did not change nor did it address the difficulties recruitment faces over the years. Since there is a tremendous study on cost analysis for such a gap it is about time to address the necessary steps to close the salary gap to improve the recruitment of MC in the RC.

b.		*Recommendation*

BUMED should continue monitoring and adjusting special pay and other incentives to create a positive appeal for potential recruit to join the reserves. Ensure that the bonus and incentive amount available for military physicians in the RC is still competitive and relevant in comparison to the civilian sector.

## C.	CONSIDERATION FOR FUTURE STUDIES

NRM is an important part of Navy Medicine that needs further research on the difficulties faced in recruitment of MC. Understanding other aspects that negatively impacts recruitment may aid in the formulation of a strategy that can ease issues in filling critical MC billets in the RC.

- Conduct a statistical analysis study using demographic information and other variables addressing specific factors associated with retention and affiliation to pinpoint trends that can be used to focus efforts on programs that produce positive results. An in depth look at this trend can shift budget allotment on recruitment effort that produce more recruits

compared to other programs. Also, those demographic trends can show certain characteristics of those who affiliate after active duty.

- Conduct a survey for those who transition from CTO to SELRES to evaluate the value of incentives other than pay that may contribute to the decision of joining the RC. Understanding those other programs such as retirement, deployment and importance of medical practice can aid in constructing new steps that may positively impact the recruitment efforts for the NRM.

- A study on the unique opportunity to practice medicine in the military as a factor that may entice potential applicants to join the service may show alternate recruitment strategy. The access to different types of medical subjects ranging from those encountered in the field to the highly technological MTFs may have a positive appeal in the taste of some potential applicants. Understanding intrinsic values that may weigh more than pay or incentives can provide an alternative pool of applicant that may join the MC in the RC.

As more trends and factors are identified in future studies a better understanding on how to address recruitment difficulties in filling billets in the MC of the RC can be achieved.

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APPENDIX A. MILITARY SPECIAL PAY

Table 10.   Incentive Special Pay

Specialty	2009	2010	2011	2012	2013	2014	2015	2016
Aer Med		20000	20000	20000	20000	20000	20000	20000
Anes		36000	36000	36000	36000	36000	36000	36000
Derma		20000	20000	20000	20000	20000	20000	20000
EM		26000	26000	26000	26000	26000	26000	26000
FP		20000	20000	20000	20000	20000	20000	20000
Gen Surg		29000	29000	29000	29000	29000	29000	29000
IM		20000	20000	20000	20000	20000	20000	20000
Neuro		20000	20000	20000	20000	20000	20000	20000
OBGYN		31000	31000	31000	31000	31000	31000	31000
Ortho		36000	36000	36000	36000	36000	36000	36000
Otolar		30000	30000	30000	30000	30000	30000	30000
Ped		20000	20000	20000	20000	20000	20000	20000
Psych		20000	20000	20000	20000	20000	20000	20000
Pul/IM/CC		23000	23000	23000	23000	23000	23000	23000
Uro		28000	28000	28000	28000	28000	28000	28000
Opthal		28000	28000	28000	28000	28000	28000	28000
Rad		36000	36000	36000	36000	36000	36000	36000

Table 11.   Variable Special Pay

Year	6	8	10	12	14	18	22
2016	416.66	1000	958.33	916.66	833.33	750	666.66
2015	416.66	1000	958.33	916.66	833.33	750	666.66
2014	416.66	1000	958.33	916.66	833.33	750	666.66
2013	416.66	1000	958.33	916.66	833.33	750	666.66
2012	416.66	1000	958.33	916.66	833.33	750	666.66
2011	416.66	1000	958.33	916.66	833.33	750	666.66
2010	416.66	1000	958.33	916.66	833.33	750	666.66

Table 12.   Board Certified Pay

Year	10	12	14	18	Above
2016	208.33	291.66	333.33	416.66	500
2015	208.33	291.66	333.33	416.66	500
2014	208.33	291.66	333.33	416.66	500
2013	208.33	291.66	333.33	416.66	500
2012	208.33	291.66	333.33	416.66	500
2011	208.33	291.66	333.33	416.66	500
2010	208.33	291.66	333.33	416.66	500

Family Medicine	Low	Average	High
2013/14	$140,000	$199,000	$293,000
2012/13	$130,000	$185,000	$325,000
2011/12	$120,000	$189,000	$300,000
2010/11	$130,000	$178,000	$290,000
2009/10	$140,000	$175,000	$255,000

Psychiatry	Low	Average	High
2013/14	$150,000	$217,000	$350,000
2012/13	$165,000	$218,000	$300,000
2011/12	$160,000	$224,000	$300,000
2010/11	$160,000	$220,000	$275,000
2009/10	$150,000	$209,000	$310,000

Internal Medicine	Low	Average	High
2013/14	$145,000	$198,000	$360,000
2012/13	$130,000	$208,000	$325,000
2011/12	$150,000	$203,000	$345,000
2010/11	$130,000	$205,000	$285,000
2009/10	$145,000	$191,000	$250,000

Pediatrics	Low	Average	High
2013/14	$130,000	$188,000	$240,000
2012/13	$145,000	$179,000	$300,000
2011/12	$130,000	$189,000	$220,000
2010/11	$120,000	$183,000	$250,000
2009/1	$145,000	$180,000	$265,000

Emergency Medicine	Low	Average	High
2013/14	$220,000	$311,000	$400,000
2012/13	$210,000	$288,000	$450,000
2011/12	$170,000	$264,000	$380,000
2010/11	$160,000	$255,000	$380,000
2009/10	$185,000	$247,000	$380,000

OB/GYN	Low	Average	High
2013/14	$215,000	$288,000	$380,000
2012/13	$225,000	$286,000	$350,000
2011/12	$180,000	$268,000	$440,000
2010/11	$220,000	$282,000	$360,000
2009/10	$175,000	$272,000	$350,000

Neurology	Low	Average	High
2013/14	$180,000	$262,000	$400,000
2012/13	$180,000	$300,000	$400,000
2011/12	$160,000	$280,000	$420,000
2010/11	$160,000	$256,000	$345,000
2009/10	$180,000	$281,000	$460,000

General Surgery	Low	Average	High
2013/14	$270,000	$354,000	$515,000
2012/13	$240,000	$336,000	$550,000
2011/12	$220,000	$343,000	$450,000
2010/11	$205,000	$336,000	$450,000
2009/10	$175,000	$314,000	$410,000

Orthopedic Surgery	Low	Average	High
2013/14	$350,000	$488,000	$700,000
2012/13	$250,000	$483,000	$750,000
2011/12	$400,000	$519,000	$750,000
2010/11	$300,000	$521,000	$700,000
2009/10	$300,000	$519,000	$825,000

Gastroenterology	Low	Average	High
2013/14	$240,000	$454,000	$560,000
2012/13	$291,000	$441,000	$600,000
2011/12	$300,000	$433,000	$550,000
2010/11	$300,000	$424,000	$505,000
2009/10	$300,000	$411,000	$600,000

Otolaryngology	Low	Average	High
2013/14	$250,000	$372,000	$500,000
2012/13	$300,000	$398,000	$650,000
2011/12	$300,000	$412,000	$530,000
2010/11	$230,000	$359,000	$500,000
2009/10	$230,000	$349,000	$450,000

Cardiology (non-invasive)	Low	Average	High
2013/14	$400,000	$442,000	$500,000
2012/13	$250,000	$447,000	$550,000
2011/12	$275,000	$396,000	$600,000
2010/11	$270,000	$420,000	$525,000
2009/10	$315,000	$420,000	$600,000

Cardiology (invasive)	Low	Average	High
2013/14	$350,000	$454,000	$550,000
2012/13	$300,000	$461,000	$675,000
2011/12	$400,000	$512,000	$650,000
2010/11	$380,000	$532,000	$650,000
2009/10	$325,000	$495,000	$680,000

Urology	Low	Average	High
2013/14	$430,000	$504,000	$625,000
2012/13	$385,000	$424,000	$650,000
2011/12	$330,000	$461,000	$650,000
2010/11	$320,000	$453,000	$550,000
2009/10	$250,000	$400,000	$550,000

Neurosurgery	Low	Average	High
2013/14	$450,000	$591,000	$700,000
2012/13	N/A	N/A	N/A
2011/12	$450,000	$701,000	$1,000,000
2010/11	$550,000	$613,000	$700,000
2009/10	$590,000	$631,000	$720,000

Pulmonology	Low	Average	High
2013/14	$230,000	$358,000	$425,000
2012/13	$225,000	$351,000	$500,000
2011/12	$180,000	$321,000	$415,000
2010/11	$200,000	$311,000	$430,000
2009/10	$200,000	$305,000	$430,000

| Endocrinology	Low	Average	High
2013/14	$175,000	$206,000	$235,000
2012/13	$170,000	$209,000	$300,000
2011/12	$180,000	$248,000	$380,000
2010/11	$180,000	$218,000	$270,000
2009/10	$200,000	$219,000	$270,000

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APPENDIX C. FORECAST MODEL

Table 13. ACF and PACF

Lag	AutoCorr	-.8-.6-.4-.2 0 .2 .4 .6 .8	Ljung-Box Q	p-Value	Lag	Partial	-.8-.6-.4-.2 0 .2 .4 .6 .8
0	1.0000		.	.	0	1.0000	
1	-0.2246		4.9461	0.0262*	1	-0.2246	
2	-0.1047		6.0328	0.0490*	2	-0.1634	
3	-0.0381		6.1784	0.1032	3	-0.1106	
4	-0.0294		6.2657	0.1802	4	-0.0931	
5	-0.0832		6.9742	0.2226	5	-0.1491	
6	-0.0048		6.9765	0.3230	6	-0.1028	
7	0.0061		6.9805	0.4309	7	-0.0791	
8	0.1356		8.9266	0.3485	8	0.0873	
9	-0.1689		11.9844	0.2142	9	-0.1543	
10	0.1032		13.1393	0.2160	10	0.0370	
11	-0.0721		13.7098	0.2495	11	-0.0901	
12	0.1828		17.4184	0.1345	12	0.1805	
13	-0.0004		17.4184	0.1809	13	0.1014	
14	0.0186		17.4577	0.2326	14	0.1172	
15	-0.0571		17.8339	0.2715	15	0.0332	
16	-0.1385		20.0708	0.2170	16	-0.1302	
17	-0.0925		21.0807	0.2227	17	-0.1169	
18	-0.0178		21.1185	0.2735	18	-0.1885	
19	0.0616		21.5789	0.3057	19	-0.0271	
20	-0.0042		21.5811	0.3637	20	-0.1906	
21	0.0463		21.8484	0.4083	21	-0.0173	
22	0.1194		23.6493	0.3659	22	0.0345	
23	-0.1469		26.4125	0.2818	23	-0.1008	
24	-0.0686		27.0228	0.3034	24	-0.1471	
25	0.1203		28.9266	0.2670	25	0.0053	

Table 14. ARIMA Normal Quantile Plot

73
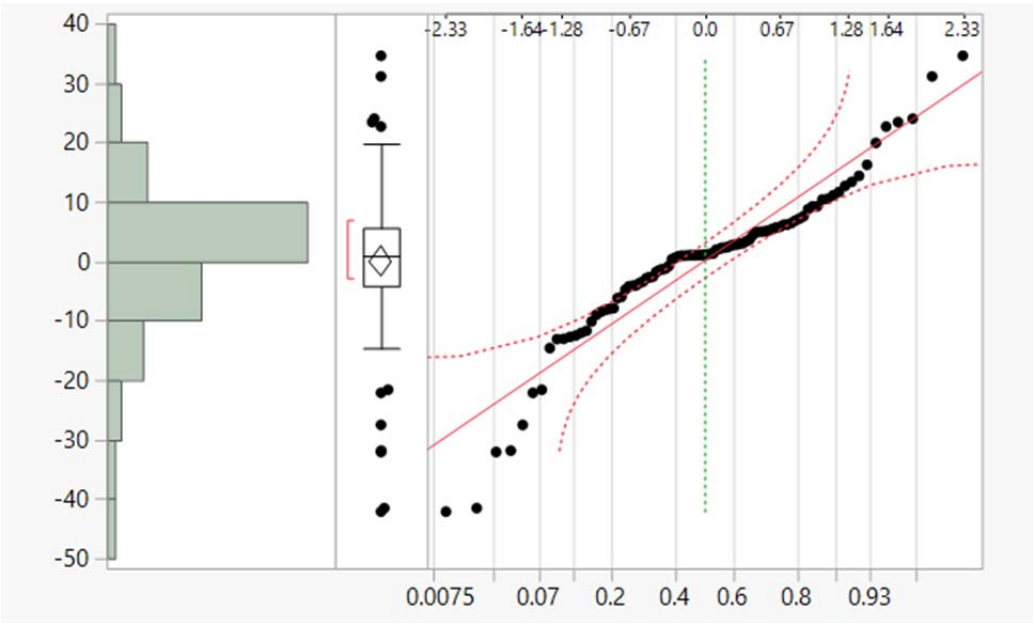
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